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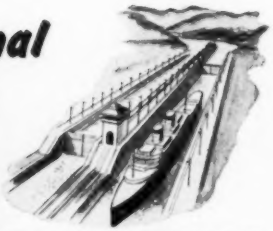

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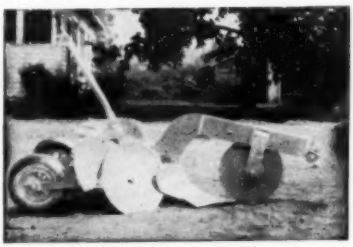

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Journal of Forestry
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Editorial

A Bold New Look at Government

With its *Concluding Report*, submitted to the Congress in May, the Commission on Organization of the Executive Branch of the Government, popularly known as the Hoover Commission in honor of its chairman, ex-President Herbert Hoover, has presented a total of 19 printed reports with recommendations for efficiency, economy, and improved administrative management. In addition, 18 task force reports, prepared for the Commission, have been published.

Of the Commission reports, exclusive of the *Concluding Report*, two are concerned with land and water policies and the conservation of renewable resources. These are the report on the Department of Agriculture submitted in February, and the report on the Department of the Interior submitted in March. Two task force reports are of interest also—Appendix K, *Water Resources Projects;* and Appendix L, *Natural Resources.*

It will be recalled that the Commission has functioned in accordance with Public Law 162, passed by the 80th Congress, and approved July 7, 1947. During its two years of existence, its main attention has been directed toward a study of how efficiently government services are being performed. As was to be expected, the Commission found much to criticize, particularly in overlapping, duplicating, and competing services.

For example, in the field of water resource development it condemns both the Army's Corps of Engineers and the Department of the Interior's Bureau of Reclamation for "confusion, and gross waste of the taxpayer's money." The Engineers are concerned primarily with flood control; Reclamation with irrigation. But the Commission finds, "There have been repeated instances where each competes with the other to begin construction on the same project. The result has been hasty planning, lack of sufficient basic data, duplicating cost of surveying and estimating, failure to consider the entire needs of the area, and the creation of strong and opposing local pressures each seeking special benefits."

All in all, the situation with respect to water resource development, as described by the Commission, is one calculated to dismay the taxpayer and alarm the advocate of efficient government. To correct it, the Commission has recommended that the Department of the Interior "be thoroughly reorganized along more functional and major purpose lines." Among the major purpose assignments would be water development and use services, in which would be included reclamation, rivers and harbor improvements, and flood control. To effect this reorganization the work of flood control and of river and harbor improvement by the Corps of Engineers would be transferred to Interior. Whether the wasteful competition between these two agencies can be ended by consolidating their overlapping services remains to be seen; manifestly, it never will be done unless the President is given authority to attempt better coordination.

Commission recommendations with respect to the Department of Agriculture are of special interest to forestry. To start with, Interior's Bureau of Land Management (except for minerals) would be transferred to Agriculture, where it would be combined with all major soil, range, and forest conservation agencies in an Agricultural Resources Conservation Service. Into another unit — Research Service — would be brought all basic research activities, including those of forest, range, soil, and water. Presumably, under this setup, the forest experiment stations and the Forest Products Laboratory of the Forest Service would be taken away from the Forest Service. If this were done, the separation

could conceivably result in less rather than more efficiency, because it is difficult if not impossible to divorce basic scientific research from the Forest Service without a loss in the type of research of value for long-term management and operation of the national forests.

A newly constituted Extension Service would come into existence in the Department of Agriculture. It would include the activities of the present Extension Service and much more besides. Presumably, extension work in forestry, now so intimately tied in with the programs and policies of the Forest Service, and through it with the several state forest services, would be carried on quite separately from the Agricultural Resources Conservation Service. While, in theory, this arrangement may appear satisfactory, in actual practice it might not be in the best interest of extension forestry, a program which in recent years could have benefitted greatly from increased attention and support both in the Department and the states.

Up to this point we have discussed the two pertinent Commission reports on Agriculture and Interior. But the task force *Report on Natural Resources* is quite a document too, and deserves mention in order to round out one's understanding of the intricacies of government and the conflicting opinions as to how sound management, economy, and efficiency may be achieved.

This task force report is significant, then, because it recommends the creation of a Department of Natural Resources out of the old Department of the Interior, which would cease to exist. In this Department of Natural Resources would be two new services of the utmost importance to forestry—a consolidated Water Development Service, and a consolidated Forest and Range Service. (The Fish and Wildlife Service and the National Park Service would continue to function largely as they do now.)

The Water Development Service would administer the present functions of the Bureau of Reclamation and the river development functions of the Corps of Engineers, together with power marketing functions already existing. Significantly, the task force report would not change the present form of the Tennessee Valley Authority, but it opposes the establishment of additional valley authorities.

The proposed Forest and Range Service would be based on the present Forest Service, but would include also the forest and range management functions of the Bureau of Land Management, and the research functions of the Department of Agriculture relating to forest insects and diseases.

But this is not all. Regional decentralization of the Water Development Service and the Forest and Range Service would be achieved by river basins "where practicable," to facilitate grass roots decisions, interservice cooperation, and local participation in planning. Regional advisory committees would be set up for both Services, with not only state and local interests represented, but other federal agencies as well. In order to provide a record-keeping and title-holding agency for public lands, reestablishment of the General Land Office is recommended.

Regretfully, it must be admitted by any serious student of the conservation movement that its history in the federal government is not always a proud record. Particularly as regards water resource development, it has been marked, as the numerous examples in these reports discouragingly show, by jurisdictional competition between agencies, by squandering of taxpayers' money, by duplication of services, and, worst of all, by waste of resources—the very thing, in short, the movement was intended to prevent. In fairness, it should be emphasized that the Hoover Commission's criticisms are mainly directed at the dam builders (Engineers and Reclamation). The overlaps and inconsistencies in the bureaus administering lands and forests —as, for example, between the Forest Service and the Bureau of Land Management in Oregon —are primarily the result of Congress's conflicting legislation, and not of interbureau inability to cooperate.

Reorganization of the federal bureaus working on the conservation of land and water resources is palpably in the public's and the government's best interests. Adoption of one of the several plans proposed, either individually or in combination, promises to result in improvement over existing conditions.

EDITOR'S NOTE.—The five reports issued by the Commission on Organization of the Executive Branch of the Government which have to do with the conservation of land and water resources, and which are mentioned in the foregoing editorial, may be obtained at the prices listed from the Superintendent of Documents, Washington 25, D. C.

Commission Report on Department of Agriculture. 41 pp. February 1949. 20 cents.

Commission Report on Department of the Interior. 94 pp. March 1949. 30 cents.

Commission Concluding Report. 132 pp. Index. May 1949. 60 cents.

Task Force Report on Water Resource Projects (Appendix K.) 65 pp. January 1949. 20 cents.

Task Force Report on Natural Resources. (Appendix L.) 244 pp. January 1949. 50 cents.

Some Economic Goals in Forest Policy

Most discussions of forest policy are focussed on specific proposals, laws, or programs. There is an equal need to turn our attention to the criteria which may be used to decide whether specific policies are good, bad, or indifferent. The following article presents a critical analysis of a few of these criteria. It suggests the need for a more clearcut conception of the goals of forest conservation than foresters have yet developed.

Henry J. Vaux

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POLICY making is perhaps the most intricate art which the forester is called upon to practice. It involves balancing values and costs of alternative lines of action in many fields. National policy decisions must be based on individual and group judgments which are, in the last analysis, subjective, and can be studied only in terms of specific policy problems. The yardsticks that policy makers use, however, play a vital role in determining the answers at which they arrive. A clear understanding of these yardsticks and, if possible, improvement in their design are continuing responsibilities of those interested in national policy.

Policy decisions are based on a variety of considerations—social, political, and economic. But only the latter group will be discussed here. Recognizing that economic effects represent only a part of the consequences which have to be considered, we will concentrate our attention on the use and interpretation of certain economic concepts as guides to wise forest policy.

Famine, Glut, and Balance

For half a century foresters have been preaching the need for more and better efforts to grow timber, if an ultimate "shortage" of wood products is to be avoided. More recently, they have occasionally been derided because the predicted timber famine has so far failed to materialize, at least in an immediately critical form. As a result of this, and of the evolution of foresters' own thinking, increasing attention has been given during the past twenty years to the twin questions of exactly what constitutes a "shortage" of timber, and of what the quantitative goals of timber production policy should be (*6*, *8*).

It seems reasonable to assume that the basic policy objective should be to promote a well-balanced forest economy; that is, an economy which sails midchannel between the Scylla of timber famine and the Charybdis of timber surplus. Foresters have long been conscious of the dangers of the former shoal. To the classical evidence drawn from the deforested areas of the world, we can now add the more vivid intimations provided by the recent upsurge of wood prices in our own country.

If present provisions for future supplies of timber underestimate future demands, timber prices will eventually move far above the levels common to past and current experience. Wood, as a high priced material, will lose one of its most important market advantages, and consumption in many lines of use will shift to other materials. In view of the nature of consumer psychology and technological development, such a shift away from wood consumption might well be permanent, in the sense that, even if subsequent increases in timber supply should eliminate the wood "shortage," many of the lost markets could never be regained. The problem of determining the effects of shortages in the supply of a product on subsequent levels of demand for that product is one of considerable practical difficulty. However, our knowledge of consumer psychology attests to the importance of habit, convention, and familiarity of product as determinants of demand. It suggests that if wood once loses some of its historic reputation for cheapness and adaptability, and if it is once displaced, even for a relatively brief period from major end uses, it will probably suffer from permanent atrophy of some of the significant factors which generate demand for it

Thus present high lumber prices have serious implications for future lumber markets. If wood prices remain long at present relative levels, substitute materials may permanently take over segments of the present market. In so far as such shifts are towards the products of mined resources, long run social losses will result. This possibility of loss is sometimes overlooked, but it is of real importance in assessing the costs of timber shortage.

It is equally important to keep in mind the possible impact of such shifts when we try to appraise long run timber demands. To the ex-

tent that we anticipate the need for a temporary period of curtailed levels of forest production if permanent wood supplies are to be assured, we must also make allowance for the fact that such curtailment will almost certainly lead to some permanent shrinkage in the economic basis for tree forestry.

If, on the other hand, we should now adopt long run policies of timber production which resulted in future stumpage supplies substantially in excess of what markets will then absorb at prices sufficient to cover the cost of production, a long period of economic chaos for timber growers would ultimately ensue. Their market position would closely resemble that of the cotton farmer of fifteen or twenty years ago. Many, if not most, private timber growing operations would be forced into bankruptcy through inability to recover capital previously invested in forest enterprises.

The potential dangers of a timber surplus have not been so widely recognized as have those of timber shortage. Indeed, so long as we were dealing with forests bestowed by the "bounty of nature," many of the social losses which accompany a *produced* surplus could not arise. Now, however, as we face the problems of growing our wood supply, we can no longer afford to overlook the fact that a glutted timber market may be just as unfortunate in its results as a timber shortage. No doubt such a surplus could not emerge in this country for many decades. But there is no more reason for us now to ignore the possibility on this account than there was for Fernow, Pinchot, and the others to ignore the implications of a shortage fifty years ago. The thought of a wood surplus is contrary to the conditioning of almost every professional forester. As Marquis (*5*) has said, "Nature's opinion of a vacuum is nothing more than a mild dislike compared to an ardent forester's abhorrence of an idle acre." Nevertheless, if we fail to recognize the possibility of a timber glut, we will do so to our own peril.

The nature of the dangers of market surpluses are known to all who are familiar with the agricultural history of the interwar decades. Forestry itself has had an all too discouraging view of the effects of glutted markets on productive forest enterprise. Many of the industrial forestry programs begun after the first World War foundered when the bottom fell out of the stumpage market. The disastrous effects of such a slump would have been magnified many times had most of the timber involved been the result of productive efforts rather than a natural endowment.

The future of public forestry would be equally at stake. It is difficult to conceive of a future Congress appropriating funds for timber growing in the face of a market glut which had resulted in part from previous public timber growing efforts.

To speak of timber surpluses in almost the same breath with timber shortages, particularly in the situation American forestry now faces, may seem absurd. But the two situations are not so far removed from one another as might appear. Both economic famines and economic gluts are symptoms of ineffective workings of the economic system. The basic conditions which lead to one outcome may be equally favorable, at a different time, to the other. For foresters, the naval stores industry provides an instructive example. Prior to 1920, this industry was characterized by a combination of dwindling resources, expanding markets, and increasing product values (*4*). In response to these conditions two things happened. Additional naval stores resources were developed in young slash pine, and paint and varnish manufacturers turned to other types of thinner. The new supplies became excessive in a market which had been significantly and permanently narrowed by the previous scarcity of supply. The period of naval stores "shortage" thus led directly to a relative overexpansion of production, to a collapse of prices, and to acute financial distress among naval stores producers. The various therapeutic measures adopted during the 1930's did not eliminate the basic problem of surplus. This swift change from a period of famine to one of surplus took place over a period of little more than a single production cycle for naval stores timber. It suggests that foresters should at least recognize a parallel possibility in thinking about future timber production.

The Growth Goal Concept

The preceding paragraphs focus attention on the need for careful adjustment of timber supply to demand over the long pull. They suggest that one of the important criteria which can be applied to current forest policies and programs is that of how well they balance our long run timber budget, leading neither to deficits nor to surpluses. They indicate that failure to achieve a reasonable balance may prove

destructive to forest conservation policies, no matter how sound in conception such policies may otherwise be. But how can we develop adequate measures to tell us whether given timber producing programs are good or bad, in the light of this need for a balanced timber economy?

How can we forecast what quantity of mature timber we should be producing fifty or one hundred years hence in order to hold the forces of supply and demand in approximate balance at that time? Some notable attempts to explore this problem have been made. An analysis of some of these attempts will help to sharpen our understanding of the nature of our goal, as well as to indicate some of the major obstacles which stand in the way of achieving it.

In 1933, Hallauer (*3*) studied wood consumption "in order to throw as much light as possible on what the nation's normal needs (for timber) may be in the future." On the basis of this analysis of available consumption data, Marsh and Gibbons (*6*,p. 237) estimated "prospective normal timber requirements," and, after due allowance for losses and a margin for safety, used the resultant figure as a measure of how much timber we ought to try to produce.

The term "normal timber requirements" was used to denote use of wood by consumers who are afforded a reasonable latitude in choice of readily available materials, including timber and timber products, when general economic conditions are such that the nation is conscious neither of depression nor of unusual prosperity.

In its recent reappraisal of the forest situation, the Forest Service makes use of a slightly modified version of this concept of "normal timber requirements." There, "potential timber requirements" are defined as "the quantity of timber products that might be used by consumers afforded reasonable latitude in choice of readily available materials, including timber products, in a national economy functioning at a high level of employment and output." (*9*, p. 1) This differs from the earlier concept only in that requirements are measured at full employment rather than at some lower level "neither of depression nor of unusual prosperity."

In the course of his analysis in *A National Plan for American Forestry*, Hallauer pointed to the fundamental weakness, for purposes of policy evaluation, of the concepts defined above:

> "Requirements" is not a wholly satisfactory term to define the extent of past, present or future use of wood. Where timber is abundant and easily accessible, "requirements" inevitably absorb a far greater quantity of this cheap and adaptable raw material than would come into demand under other circumstances; competition from other materials is reduced; substitution moves rather in the opposite direction, and wood replaces other more costly and less readily accessible materials. On the other hand, where wood is scarce and hard to get, actual use is not a measure of what requirements might be under more favorable conditions. The community or region might not consciously demand more wood and may yet be at a disadvantage in a number of ways through lack of abundant supply of wood at hand. (3, p. 245).

This statement merits close study because it both states the limitations of the concept of requirements and gives a clue to how it needs to be modified to provide a more adequate criterion. Use of wood by consumers "afforded a reasonable latitude of choice" may not be a good measure of the goal of a balanced timber economy because the notion of "reasonable latitude of choice" bears no necessary relation to the conditions of wood supply which those consumers will inevitably have to face. It may be possible, through wise planning, to make wood very abundant, in which case latitude of choice may be more than "reasonable." Or natural productive capacity of an area may be so low that, despite our best efforts, wood is still hard to produce and scarce in the market. Under such conditions, too, "reasonable latitude of choice" will have little relation to the facts of the problem.

The requirements concept is thus deficient as a criterion for use in establishing growth goals because it recognizes only half of the forces which affect the delicate balance which policy must try to achieve—the forces of human wants. A fully adequate yardstick should also reflect the other side of the balance, and should recognize the forces of human ability to produce.

Our objective will be achieved if, a hundred years from now, we are producing and consuming an amount of timber such that the receipts from marketing our product are just equal to all the costs we have incurred in producing it, including a competitive profit, and if no timber growing facilities which could have been profitably used have been allowed to lie idle. So, in planning for this objective, we must consider both prospective market demands and prospective costs of timber production.

Policies and programs which base objectives on the existing concepts of timber requirements alone may be defective because they assume that the required quantities of timber can be produced at a cost which will permit their sale at

a price which will afford consumers "a reasonable latitude of choice" as between timber and competing commodities. In a very careful analysis of the nature of requirements studies, Rettie (*7*) points out that the upper limit of long term timber production is determined by the amount of capital and labor we decide to bestow on the job. He emphasizes the need for requirements estimates in reaching this decision. However, he overlooks the coordinate importance of the relative availability of capital and labor as a determinant in the problem. The additional question to be answered is that of prospective costs of timber growing. As foresters, we should be able to analyze these costs at least as effectively as we can analyze the factors affecting demand for wood. When we assume away this phase of the problem we have not only reduced the significance of our studies in the whole requirements field, but we have failed to meet our obligation of providing the non-technical public with vital information in the area of our own technical competence.[1] We have been trying to sell our wares by telling the customers all about the advantages of our product. We haven't yet divulged (perhaps we don't yet know) what the price tag says. As a professional group, we have so far failed to live up to our full public responsibilities by not analyzing the prospective costs of timber production with the same care that we have given to analysis of the needs for forest products.

There is danger that the growth goal described above, emphasizing as it does both needs and costs, may be confused with a mere forecast of future consumption, based on historical trends. The danger of using such a forecast as a policy goal has been frequently noted (*1, 7*). Our concern in the problem of a growth goal is not with the prospective level of consumption which would emerge if historical trends continue unabated. It deals with what prospective consumption might be, if, with adequate foresight, we now put into effect a program to make full economic use of our forest resources. A sharp distinction between these two different levels of prospective consumption is fundamental to clear understanding of our problem.

The Place of Long Range Forecasting

If we can agree that the job of establishing proper goals of timber production policy involves analysis of both human wants (demand) and human abilities to grow trees (supply), we may turn to a still more formidable problem. Given the dynamic nature of the world around us, is it reasonable to suggest that we can foresee the future well enough to place any faith at all in such goals as we might now establish, based as they must be on present forecasts of the events of the next half-century or more? Many foresters reject completely the idea that such long range planning is of any value (*2*). They argue that any forecast over such a long period assumes a degree of prescience which is ridiculously presumptuous in the light of the known impact of such things as cyclical economic fluctuations, changes in labor and capital productivity, changes in patterns of income distribution and other economic variables subject to political control, wars, and technological improvements. Devastating as this argument is, it misses the fundamental point. For as soon as we adopt a policy which has implications for the long run, and as soon as we make use of those long run implications in defense of our policy, we have either consciously or unconsciously made a "forecast" of those future conditions which are here in question.

Foresters are not likely to confine their analyses of the benefits of forestry to what can be foreseen in the next couple of decades. Tangible though these benefits may be, they still represent only a small portion of the total benefits to be derived from effective forest management. The major impact of such benefits is reserved for the more distant future, and this condition cannot be modified unless we find some way of growing our crop in less than fifty or one hundred years. So when we argue that sustained yield forestry is a worthwhile objective because it insures more adequate crops of timber for the wood markets of the future, we are really assuming that such markets will exist on a scale adequate to absorb the wood that we wish to grow, without undue waste of productive effort.

Under circumstances which have prevailed in the past, and with reference to individual forest properties, no crystal gazing is necessary to justify the assumption. But when we begin to talk in terms of the whole forest economy and of all our 461 million acres of commercial forest land, we generalize the assumption and imply that the market will absorb all of the output of this area at a price which will cover the cost of

[1] It should be noted that these comments are concerned only with the concepts which have been used. Evaluation of the methods employed in measuring requirements lies beyond the scope of this paper.

production. In the absence of a careful analysis of what these costs of production may be, such an assumption leads us onto very treacherous ground (*5*). Foresters thus face a situation where they must make forecasts (implied or explicit) if they are to give any weight to the long run values obtainable from forest management. In the face of this dilemma, the clearer our analysis of future trends of demand and cost and the better our understanding of what factors in our problem are stable and what ones are unstable, the more defensible our position will become.

The Significance of Profit

The growth goal concept, with its emphasis on a balance between timber supply and demand, and the corollary of maintaining reasonable profits for private timber growers leads to some questions. You may say, "True, a surplus of timber might 'deprive' him of 'profits' who wishes to profit on the bounty of nature in growing timber. Will not the public, however, benefit from an abundance of stumpage?" (*2*, p. 1067.) Such a question is based on a misconception of the nature of normal profits in a competitive economy. Normal profit is something more than a mere "cut" out of the proceeds of an enterprise. Above all, it is a symptom of efficient allocation of resources. If investments made now in timber growing fail to pay out when the timber matures, the social consequences are much more serious than the mere fact that a business man has gone bankrupt. The failure means also that capital and labor have been put into a use which, from the standpoint of society, was less essential and less productive than some alternative line of investment which was not exploited.

Bankrupt private timber growers are not the only symptoms which may arise to indicate overexpansion of forest production. If, with full employment, government undertakes forest investments which in the long run do not prove to be self-liquidating, the social consequences are just as bad as in the case of the private investor who fails, although these consequences may be harder to detect. As public funds are limited, their investment in timber growing precludes some other line of public economic development. If the forest investment then results in production of "surplus" stumpage, society has been deprived of the results of some other kind of productive activity (perhaps more roads or schools) which would have yielded it greater returns. And the fact that stumpage may then become abnormally cheap offsets only in part the social losses resulting from the initial unwise allocation of public funds.

The analysis of the preceding paragraph must, of course, be qualified if we are talking about periods of severe unemployment or low levels of new investment. So long as the alternative to investment in forest conservation is mere idleness of either labor or capital, any amount of forest development which can be undertaken by the otherwise idle productive forces is all to the good. But this is not the situation in which we now find ourselves. And principles which are sound in depressions cannot be applied indiscriminantly in periods of full employment.

Growth Goals and Public Forest Policy

A full examination of the relation of the growth goal concept to current problems of forest policy lies outside the scope of this article. But one or two points seem worthy of preliminary discussion. We have recognized the importance of striving for a balanced timber economy. But this is a very difficult end to achieve. One major source of trouble, inadequate foresight, has already been mentioned. An equally formidable obstacle stems from the fundamental nature of the forest economy itself. The nature of this obstacle has been very thoroughly explored by Zivnuska (*10*). It is sufficient to note here his conclusion that, because of the long period required for timber production and the peculiar nature of forest capital, the normal forces of competition do not operate smoothly and swiftly to encourage the sort of balance we seek. We therefore face the question of what, if anything, can be done to facilitate reaching and maintaining an appropriate long term balance between timber supply and demand.

Enough has already been said to indicate that what we need most of all is improved ability to anticipate future developments before we feel their economic impact. Only through such improved anticipations can we avoid the social costs which flow inevitably from misallocations of productive effort. The better our foresight, the less we will need to rely on purely palliative measures. The latter can, at best, only mitigate in part the social costs of past errors in judgment, and redistribute such costs among those best able to bear the burden currently. Fire

prevention programs cannot eliminate the fire problem. Efforts to anticipate future supply and demand conditions cannot eliminate the problems of instability in the forest economy. In both cases, however, preventive efforts merit high priority. The savings resulting from better planning of our long range program of timber growing are directly analogous to, and can be commensurate with, the savings from effective fire prevention.

An excellent start in the needed direction has already been made in the requirements work of the Forest Survey. Such work needs development and expansion, particularly in the direction of appraising the effects on potential demand of changes in product prices and of changes over time in the relative abundance of forest products themselves. Difficult problems of technique must be faced, but progress along these lines seems assured.

Requirements work alone, however, is only one blade of the shears. Our preceding analysis has emphasized the equal importance of studies of the costs of producing various total quantities of forest products. The foundations for such studies have already been laid in the inventory and growth data of the Forest Survey and in studies of costs of timber growing in several regions. When these have been completed and extended, we can proceed to the basic job of analyzing the two phases of our problem in relation to each other, and to a determination of realistic timber growth goals which adequately reflect the limitations of human abilities to produce, as well as the less limited human capacities to consume.

The jobs described above are research tasks of no mean importance. We may well consider whether our current research policies and programs give adequate weight to these lines of study. Beyond this, and until we do know more of the fundamental facts which will determine long run conditions in the timber market, we will have to be content with policy palliatives, designed to mitigate the impact of unbalances, but impotent to prevent their occurrence.

Conclusion

Although the forest policies which we adopt are of vital importance to every professional forester, most of us are, at best, only part time practitioners in the policy field. As a result, forest policy has had less critical and analytical study than its importance warrants. Our thinking has usually been directed toward specific measures, rather than toward basic objectives and their implications. Perhaps more discussion and analysis of these fundamental aspects of policy may help us to see more clearly where we want to go and how best to get there.

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Business Problems in the Effective Use of Forest Resources[1]

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WHEN ONE approaches forestry from the industrial point of view, one is impressed with the extent and realism of the research which has been done in silviculture over the past forty years and in utilization for a somewhat shorter period. These achievements have advanced the problems of forestry immeasurably toward solution.

Business research in forestry has been very limited. But the achievements of management have been notable and there is substantial evidence at present of the development of that cooperation between creative management and research which has been so fruitful in other fields.

We have in New England forestry certain special problems, and also special opportunities. I should like to discuss some of these problems and opportunities from the business point of view.

One of these problems is to develop more extensive data on the present and potential growth of New England forests. Prof. R. P. Holdsworth of the University of Massachusetts has drawn attention forcibly to the need for additional data on this point. I have not had a chance as yet to read Mr. Baldwin's study[2] currently in the press, but it is my understanding that the basic data are, at the best, incomplete.

The Southern Forest Experiment Station at Crossett, Ark. has had a research program in force for nearly twenty years which gives extensive evidence on the growth to be expected in that region under silvicultural methods varying from no care at all to selective cutting on a one year cycle. These results are summarized in part in Bulletin 861 and mimeographed releases, but the experiments have to be seen to be fully appreciated.[3] Once the growing stock has been built up, the evidence indicates they can average 300 board feet of pine per acre on large areas and possibly as much as 500 feet. This involves selective cutting on a six- to eight-year cycle.

A number of competent foresters believe we can beat these figures in New England because our land will support more trees per acre. The effect of growing stock whether measured in board feet or basal area on growth per acre is dramatic, but it is also a very complicated subject. In planning forest policies, estimating investment return, and in establishing policies of wood-using industries, we need more evidence on growth and more experimental forests. On a straight business basis the cost would be returned many times over in assisting this region to establish and maintain a competitive position.

One of the main driving forces in business is competitive position—the ability to produce and sell a better product at a lower cost. The leaders in each industry seek to establish a favorable differential and the others seek to overcome their disadvantage. It is out of this race that the fact of profit emerges for the leaders.

New England pulp mills are in competition among themselves and with others in the Appalachian area, the Lake States, the South, and the West, each in that part of the paper industry it serves. A favorable differential, quality considered, of $3 a cord at the mill over competitors in other regions, in addition to our natural freight differential, would be reflected throughout the New England economy. If this were combined with sound forestry methods the advantage would be cumulative. I suspect that nature has done its part and that the issue depends on the extent to which creative management and research can be brought to bear.

Of course you may say the New England pulp manufacturers are exerting themselves to the full at present; this is as it should be. The

[1]Presented at the New England Section meeting, Society of American Foresters, Boston, March 3 and 4, 1949.

[2]Baldwin, Henry I., Wooden dollars. Federal Reserve Bank of Boston, 1949.

[3]Reynolds, R. R., W. E. Bond, and Burt P. Kirkland. Financial aspects of selective cutting in the management of second growth pine—hardwood forests West of the Mississippi River. Tech. Bul. No. 861, U. S. Forest Service. 1944.

important question is whether they are applying all of the facilities of modern management in a fashion to surpass the best that is being done in other regions.

One problem in New England pulpwood is somewhat disturbing, the spruce-hardwood situation in northern New Hampshire and Maine. Since the latter part of the nineteenth century spruce and other softwoods have been cut in this region and driven out on the rivers. Green hardwood won't float. The result of sixty years of cutting spruce appears to be a rather serious suppression of spruce by hardwoods. Redressing the balance will require a new type of transportation because hardwood still won't float. It will require extensive silvicultural treatment on a large scale, and also a large market for hardwoods. An important factor is the effect of silvicultural practices on disease, especially in the removal of overmature trees.

There is another problem in the effect of integration on cost. The Crossett Lumber Company of Crossett, Ark. adopted in 1934 a policy of sustained yield forestry with selective cutting on a six- to eight-year cycle. The holdings of the company total some 500,000 acres. Each tree is appraised on its prospective growth over the next six to eight years. Some persons believed that the cost of recovery per thousand feet or cord would increase, but as a matter of fact it declined.

Good pine sawlogs go to a well-laid-out sawmill. Limbed tops, thinnings, and crooked logs go to a 300-ton kraft mill, completed in 1937. Good hardwood goes to the sawmill, and other material to a wood distillation plant.

The point is that substantially everything is recovered, and each part goes to the operation which will show the highest net return. This is a type of competition we in New England have to meet. I have been informed that this integrated sustained yield program has spread to some 5,000,000 acres in the South and will probably be used on 50,000,000 acres within fifteen years.

A friend of mine in northern New Hampshire bid on a logging chance which included large spruce. He sawed out some of the spruce with special care and sold it for piano sounding boards. It was only the accident of his getting the logging contract instead of a pulpwood contractor that kept this spruce out of a chipper. And many of us have stood by a chipper while sap face yellow birch worth $180-$200 went through. Can our paper mills afford to make paper out of cabinet wood?

To meet the rigorous competition to be expected from southern paper mills in the next twenty years some provision will need to be made for integrated utilization—probably sawmills in connection with paper operations. A skilful administration of joint cost apparently can reduce the cost of chips going to a digestor; I don't know by what amount, but research now under way should throw light on it.

There is a reverse problem in southern New England, where a market for pulpwood is needed for small material removed in selective cutting as a byproduct of lumber. It is interesting to speculate whether this problem could be met by chipping pulpwood locally, reducing the chips to about a ten percent moisture content, and shipping them to pulp mills much as grain is handled.

It will be unfortunate if the efficiencies of modern forestry appear too exclusively in the large pulp and paper operations, for this might extend large holdings unduly. There are many natural advantages of small-scale forest holdings and of local forestry operations. But these relatively small operations need all the advantages which effective management and research can bring to bear.

I addressed myself to this problem in an article, "Business Organization for Effective Use of Forest Products," which appeared in the *Harvard Business Review* for September, 1948.

A Suggested Integrated Operation

It seems to me that a balance of advantage might apply to an organization employing about one hundred persons in a central mill and in woods operations within a radius of about twenty miles. All the material would be cut on a sound sustained yield basis under the supervision of competent foresters, partly by farmers and local contractors and partly by woods crews attached to the mill. All the material would be sorted in the woods or brought to the central mill for sorting. Part would be sold in the log or bolt, and the rest would be processed to meet as exactly as possible the specifications of wood-using industries or in some instances of consumers. The mill and its equipment would be expensive because it should be designed to take advantage, as a

packing house does, of the full possibilities of joint cost in handling a complex raw material.

The central feature of such an organization would be a management team of eight to ten men including a general manager, chief forester, production manager, sales manager, controller, and research director. It would be the function of the sales manager to know just where each component could be sold to the best advantage, and in selling logs to know what alternative net recovery could be obtained by processing them. It would be the function of the entire group to use the best means of modern management to reduce costs and make the products meet specifications in the most advantageous market of sale.

Operations already in the competitive picture are ordinarily not as completely integrated as this. Many are highly successful. Possibly in this suggested organization I have carried the factor of integration too far, but other evidence indicates that this degree of integration might lower substantially the cost of overall operation from the stump to the finished product.

If such an enterprise with integrated utilization and a sound sustained yield forest program could be made highly profitable it would be widely copied. There is room for a large number of such enterprises in New England. They should attract some of the ablest young men in the field and give them opportunity to demonstrate in the crucible of competition the essential soundness of good forestry.

I do not have at present enough evidence to know whether such an operation can be made successful, but I expect to get that evidence.

A central mill of the type described would need one or two leading products. One possibility is hardwood flooring, not made at present in any considerable volume, as far as I can discover, in New England. Granted that something like a hundred mills have gone into this field since the war, that many of them will be forced out and that prices began to decline last September, still one may wonder whether there is an opportunity in New England for one or more new, well-equipped, and well-administered flooring mills. I am impressed by the fact that many owners of small lots of oak have great difficulty in finding a market. Yet a large part of the oak flooring used here comes from Tennessee and Arkansas. Furthermore, people who prefer hardwood are being forced by current prices and quality to choose asphalt tile.

Some very interesting research is now under way at the Harvard Forest on the experimental sawing of hardwood with special attention to flooring. In order to throw added light on this problem I plan to examine the cost and price structure of oak by grades of logs and lumber from stumpage through to flooring laid and finished. Then by a corresponding study of costs of conversion from one stage to the next under the most efficient processes available I hope evidence for informed judgment on the feasibility of flooring enterprises can be obtained.

May I depart from a consideration of purely business factors to point out that forestry is eminently adapted to the emerging industrial emphasis on conditions of living? Let us envisage a site in the center of an adequate forest region, carefully chosen as the location for a classical New England village. Possibly 1,000 acres of land away from present towns would be selected as the site. Such a venture could command the highest talents in architecture and community planning. It should be a complete community with church, schools, stores, inn, and town hall, and with a forest products mill architecturally and in operation an integral part of the community. Such a community could be a further expression of a spirit which has produced sound enterprises and beautiful communities in this region for three hundred years. An enterprise so located would have a waiting list of applicants for all positions. If administered with the skill and wisdom such an enterprise warrants, I believe the costs of operation would be low enough to make a sound basis for the community.

Other Forest Products

One further factor to which I invite your attention is the effect of nonlumber products on the business structure of forestry. Possibly research has been concerned too fully with lumber and pulpwood. If it were possible to obtain a net recovery of $2 per acre per year from other products without reducing substantially the production of lumber and pulpwood, the structure of forestry would be revolutionized. We can envisage what it would mean if the owner of 500 acres could look forward to $1,000 a year without cutting crop wood.

In pursuing this line of thought I should

like to indicate a series of possibilities. Some of them are almost certainly impractical, possibly a majority are, but I seriously question whether all of them are impractical.

Truffles are fungi, one of the ascomycetes, which grow in forests in France and elsewhere. They grow under ground, their spores apparently being spread by insects and rodents. Truffle hounds are trained to smell them out and indicate where to dig. A colleague in the biology department tells me he sees no reason why they would not grow here. Yet I note in the S. S. Pierce Catalogue that they are quoted at $2.59 for a 4½ oz. tin, or roughly $10 a pound. I am curious as to why a product one is reputed to be able to grow in New England should have a market price of $10 a pound. Abroad hogs are fattened on some of the coarser types of truffles.

The same colleague drew to my attention another edible fungus reputed to have a fine flavor, one of the basidiomycetes, *pleurotus ostreatus*. It grows on rotting wood and possibly could be cultured on banks of wood chips.

In western New York apparently some success has been attained in producing English walnuts by budding on black walnut stock. One of the ablest pomologists of my acquaintance tells me he sees no reason why filberts cannot be grown as profitably in the East as in Oregon. Chinese chestnuts seem to offer some promise. A further question is whether there are varieties of the tung nut tree which grow high enough on the slopes of the mountains of southwest China to be acclimated to a climate like New England's. Have we as yet made full exploration of these and similar possibilities? It wouldn't need many English walnuts to equal $2 per acre.

I am informed that Smithfield hams acquire their distinctive flavor because they come from mast fed hogs. One advantage of mast fattening of hogs is that the hog does the harvesting and a hog's time is not very valuable. Could our forest geneticists develop dual purpose oak trees which could compete effectively with the oaks of Virginia?

Have we explored fully the business possibilities of wildlife management? Senator Ralph Flanders makes a very persuasive case for raising musk oxen on a suitably fenced area in Vermont. The meat is described as better than beef and the wool does not shrink. I strongly suspect that with appropriate encouragement from this group Senator Flanders might be able to get this experiment under way. Once an area is fenced and protected other possibilities arise. A friend of mine who has made a lifetime study of moose and deer draws attention to the fact that the forests provide food for a tremendous population of deer and moose for ten months of the year; protection and a little feeding for two months will in his opinion produce venison cheaper than beef. It wouldn't take much venison to amount to $2 an acre.

Two other animals warrant careful study: the beaver and the skunk. Let us envisage a small pond and a few acres of swampy land planted with poplar and willow, the whole securely fenced. Once or twice a week hardwood brush cut into 6- to ten-inch lengths for ease in handling would be hauled from current cutting operations to the pond. I have never been able to get evidence on the cost of converting cambium into beaver skins, but can we say that the business possibilities of forestry are fully explored until that evidence is available?

The skunk is a lowly animal which can protect itself against everything but guns and steel traps. All he asks is a dry den and insects. To what extent would maximizing the skunk population affect insect pests and what would be its effect on net recovery of $2 an acre?

It would be possible to continue almost indefinitely, but time does not serve. Bacteriologists and mycologists think that the fermentation of wood is a highly fruitful field of research. The ceramic engineers see possibilities in a porous insulating building block made of 40 percent brick clay and 60 percent sawdust, self-burning in proper kilns by combustion of the sawdust.

The important thing is that a net byproduct recovery of $2 per acre, or $3 or $4, would revolutionize the business structure of forestry.

In summary, the competitive position of New England forest industries needs continued development of that combination of aggressive management and research which has been so fruitful in all industrial fields. We need it both in large operations and especially in small local operations. There is another essential component; the spirit of enterprise and adventure which took Yankee sailing vessels to all the ports of the world.

As foresters you have intriguing opportunities in the next twenty years, but these opportunities require vigilance. Possibly in ending one might paraphrase Holy Writ; the keeper of New England forests shall neither slumber nor sleep.

Some Effects of Temperature on Germination and Development of Pinyon Pine[1]

The first few weeks after emergence from the seed constitute the most critical time in the life of a seedling. Good development during this period may determine its survival. A study of pinyon pine grown at different temperatures showed how soil temperature can have an important influence on the juvenile development of seedlings.

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ALTHOUGH many investigators during the past half century have studied the effect of temperature on the germination of seeds, few have continued their experiments beyond germination to include the early seedling stage. This study was undertaken primarily to determine the effect of temperature on the weight lost by respiration during the germinating and early seedling stage. Other temperature effects that occurred in the course of the experimentation will be noted.

The important literature on the relation of temperature to seed germination published during the last century and a half has been excellently reviewed by Edwards (*3*).

Experimental Methods

Nut or pinyon pine (*Pinus cembroides* var.) seeds were chosen for the study because of their large size and high germinative capacity. By individually weighing 50 seeds to the nearest milligram the moisture content was found to be 5.65 ± 0.18 percent. Seeds weighed individually to the nearest milligram were germinated at constant temperature between moist blotters and allowed to remain there in darkness while the seedlings developed. Seedlings were exposed to light only for the very short periods when daily checks on germination and growth were made. Moisture and aeration were kept as uniform as possible for all lots. Constant temperatures of 40, 55, 70, 80, and 90° F. were used. The lower three temperatures were maintained within two degrees and the higher two were maintained to within one degree. Refrigerated cold rooms were used for the lower two temperatures and germinating ovens for the three higher temperatures. Seeds failing to germinate within 30 days were eliminated from further study and all seedlings which molded were excluded from reported results. Root growth was traced on the blotter with a crayon pencil and the seedlings were removed whenever growth ceased. Seedlings were then measured and dried to constant weight at 105° C. Length measurements given in Table 2 include the length of the cotyledons. In cases in which the cotyledons had not emerged, the length of the endosperm was added to the root length. The dried seedling together with the remains of the seed was weighed before and after removal of the seed coat. The original weight of the endosperm was then found by subtracting the weight of the seed coat from the calculated oven-dry weight of the seed which in turn had been determined by applying the previously determined moisture-percentage constant to the original weight of the seed. A few of the dried seedlings in each temperature group were weighed separately from the remains of the seed. The results are shown in Part 2 of Table 2.

Since there was no germination within the 30-day period at 40° F. and only 35 percent germination at 55° F., two lots of seeds were germinated at 70° F., and removed to the cold rooms within 1 to 24 hours of germination. As shown in Table 2 there is no significant difference between the average daily growth and respiration losses of those germinated and grown at 55° F. and those germinated at 70° F. and grown at 55° F. The greater total growth of those germinated at 70° F. is chiefly due to the fact that the seedlings continued to grow for a longer period. It was therefore assumed that the results obtained from the seedlings germinated at 70° F. and grown at 40° F. are approximately the same as would have been obtained had the seeds germinated at 40° F. Data from the "70-40" column in Table 2 are used for 40° F. in Figure 2. Data listed in the "70-55" column are not used in Figure 2.

In all cases germination was considered to

[1]The author wishes to express his appreciation to Dean F. S. Baker of the University of California for suggesting this problem, patiently guiding the work and critically reading this paper.

have occurred when the radicle appeared through the ruptured seed coat.

Discussion of Results

Temperature and Germination

Germination was most rapid and complete at 70° F. Figure 1. Table 1. At temperatures higher than 70° F. the average time to germinate and total germination within 30 days decreased rapidly though the time required for initial germination remained unaffected. Below the optimum temperature time necessary for initial germination increased, as did average time to germinate and total germination decreased. At 40° F. there was no germination within the 30 day period, but one seed in the lot germinated about the 85th day. The superiority of 70° F. is even more significant when germination in a short period of time, such as 15 days, is examined. At the end of 15 days 84 percent of the seeds at 70° F. had germinated, 37 percent at 80° F., 22 percent at 90°F., and 5 percent at 55° F.

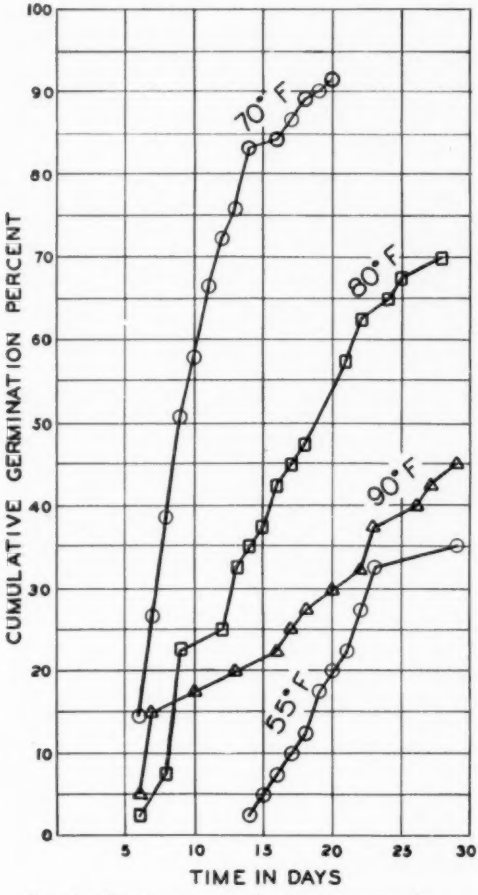

FIG. 1.—Relation of germination to temperature.

The temperature found to be optimum for germination in this study is somewhat lower than that reported by most other investigators. Edwards (*4*) found the optimum temperature range for germination of soybean to be 92 to 98° F. and reports that within this range germination was most prompt and complete. Haasis and Thrupp (*7*) worked with lodgepole pine and reported optimum temperatures for incubation periods of one day or less to be 97 to 106° F. and for longer periods a double optimum of about 92° and 110° F. is reported. Kotowski (*9*) gives the optimum germination temperatures (based on highest number of seedlings produced) for 17 vegetables. They range from 39° F. for spinach to 64° F. for tomatoes. Tang (*15*), who experimented with wheat at seven different temperatures ranging from 54° F. to 113° F., reports an optimum of about 90° F. for the shortest incubation periods and about 75° F. for the longest. Wilson and Hottes (*16*) found the optimum for complete germination of wheat to be between 50 and 60° F. They say that higher temperatures of 70 to 85° F. gave more rapid but less complete germination.

The lowest temperature used, 40° F., is apparently very near the minimum for germination of pinyon pine. Minimum temperatures like optimum temperatures vary greatly with

TABLE 1.—GERMINATION AT VARIOUS TEMPERATURES

	Temperature °F.				
	40	55	70	80	90
No. seeds used	18	40	83	40	40
Av. germination in 30 days (percent)	0	35	92	70	45
Av. time to germinate (days)	—	19.8	10.1	15.2	16.0

the species. Coffman (*2*) reviews the work on various vegetables and other crop plants. Minima reported in his paper range from 32° F. for mustard, peas and small grains to about 63° F. for cantaloupe. Particularly interesting are the results of the Russian Timiriazeff (cited by Coffman), who surrounded rye, wheat, bean, cabbage and mustard seeds with ice two feet thick and two months later found rootlets of each species piercing the ice cakes. Among a number of species of oaks, Korstian (*9*) observed little germination until the temperature went consistently above 40° F.

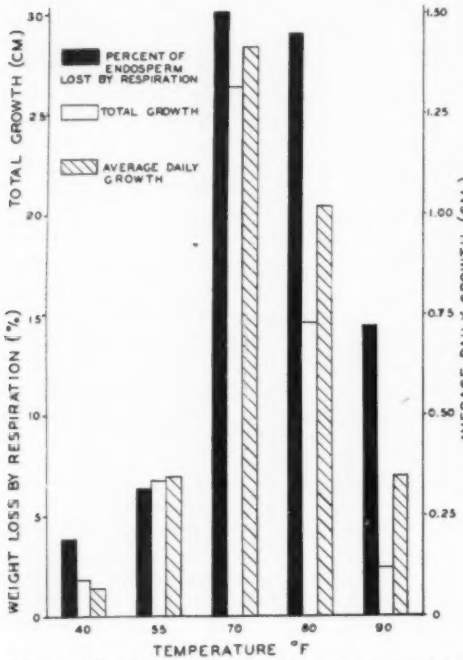

FIG. 2.—Weight loss, total growth, and average daily growth at various temperatures.

The maximum temperature at which germination of pinyon pine occurs doubtless lies somewhat above the highest temperature used in this study, for lodgepole pine will germinate at 135° F. (*7*) and rice at 108° F. (*11*).

Temperature and Growth

The optimum temperature for the growth of the seedlings was also in the proximity of 70° F., as can readily be seen from Table 2 and Figure 2. Not only were the longest seedlings produced at this temperature but the average daily growth was the greatest. The number of days during which growth was maintained decreased as the temperature rose from 55 to 90° F. The tips of the roots of some seedlings in the 80° F. oven died or dried up but fairly rapid elongation continued at the upper end. At 90° F. many root tips died and growth ceased in a few days. While the average daily growth at 90° F. was the same as at 55° F., the total length of the seedlings produced is much less because of the shorter period of time during which growth was maintained.

Several investigators have reported on the

TABLE 2.—GROWTH AND WEIGHT LOSSES AT VARIOUS TEMPERATURES

	Temperature °F.					
	70-40	70-55	55	70	80	90
Part 1						
No. seedlings used	10	14	14	32	19	17
Av. growth period (days)	25.6	29.3	19.6	18.6	14.3	6.8
Av. length of seedlings in cm.	1.8	10.0	6.8	26.4	14.6	2.4
Av. growth per day in cm.	.07	.34	.35	1.42	1.02	.35
Endosperm lost by respiration (percent)	3.86	5.85	6.37	30.07	29.04	14.43
Standard deviation	1.74	2.94	2.14	5.77	8.88	5.58
Growth per mg. wt. lost (cms.)	.34	1.43	.85	.62	.39	.12
Standard deviation	.19	.77	.52	.18	.16	.07
Part 2						
No. seedlings used	10	14	6	6	7	10
Percent of endosperm used in producing seedlings	7.84	62.66	31.90	93.19	89.24	26.29
Standard deviation	2.89	14.88	14.31	2.71	5.84	18.28

effect of temperature on seedling elongation and all found changes in temperature to cause significant differences. Adams (*1*) found an increase in average root length of white pine seedlings from 47 mm. to 161 mm. when the soil temperature (measured at a depth of 8 inches) was increased from 45° F. to 87° F. Gericke (*5*) found the highest average hourly rates of shoot elongation of wheat at 83-88° F. Lehenbauer (*10*) in his classical work with maize reports different optimum temperatures for different periods of time but for periods longer than 3 hours the optimum temperature lies between 84 and 90° F. The difference between even small changes in temperature were very significant; e.g. an increase in temperature from 70 to 71.5° F. resulted in an increase of the average hourly rate of elongation from .53 to .59 mm. or 11 percent. He also reports that at temperatures above 88° F. initial growth rates were not maintained, and the higher the temperature the shorter the period of time that initial rate was maintained; e.g. at 110° F. growth rate decreased after 3 hours. Mack's results (*12*) show that the average final length of the ten largest wheat seedlings was the greatest at temperatures of 68 to 77° F. for partial pressures of oxygen approximating atmospheric conditions. Rudolf (*13*) raised bean seedlings in darkness until growth ceased, using temperatures ranging from 41 to 68° F. He reports practically no growth at 41° F., the best at 68° F.

The range of temperatures employed in this study did not reveal the minimum and maximum temperature for growth. However, it appears that these lie not far beyond the lowest and highest temperatures which were used in the study. Yocum (*17*) says that the minimum temperature for growth is about 32° F. Lehenbauer (*10*) found growth for at least 9 hours at temperatures as high as 110° F. He and other investigators have shown that plants may be subjected without fatal injury to temperatures higher than that at which growth may be maintained.

Weight Losses by Respiration

Weight losses by respiration were low at 40° F., were slightly higher at 55°, and became much higher when the temperature was increased to 70° F. There was no significant difference between weight lost at 70° F. and weight lost at 80° F., but there was a considerable decrease as the temperature increased to 90° F. These values expressed as a percent of the original weight of the endosperm are shown in Part 1 of Table 2 and also graphically in Figure 2. The average growth in centimeters per milligram of weight lost, which is also shown in Table 2, was the greatest at 55° F., although the differences between the values for 55 and 70° F. are not statistically significant. It will also be noted that these values, which might be used as an index of efficiency, become very low at 90° F.

Part 2 of Table 2 shows the percentage of the endosperm which was used in producing the seedling, for the weight losses here include not only respiration but also the material translocated to the seedling. These total weight losses correspond approximately to the length of seedling produced.

Shirley (*14*) studied the utilization of organic reserves of maize seedlings and found that there were no significant differences between weight losses in light and darkness when the soil temperatures were kept the same, but in the course of his experiments even slight differences of soil temperature resulted in faster utilization of the food reserves. His observations of the stronger appearance of young coniferous seedlings in the open led him to suggest that the seed of young coniferous seedlings under shade may be sloughed off before the food reserves are used because of the retardation in utilization of the reserves caused by lower temperatures. My results also indicate that this may be true.

Application of Results

This experiment has shown that soil temperature can be very important because it not only influences germination percent but also the subsequent development of the seedlings. Extreme temperatures will cause seedlings to be weak and poorly developed. The survival of the seedling depends upon its being able to get the radicle down fast enough to a dependable supply of water and water-soluble nutrients. From the results of this experiment it would seem that at high temperatures the food reserves of the seed are used up before the radicle has been extended far enough. While there seems to be little likelihood of excessive respiration at low temperatures, growth is so slow that the radicle may not be able to reach the water and nutrient supply fast enough. The middle or optimum temperature produced both the fastest-growing and longest radicle.

Summary

1. Temperature of 70° F. or thereabouts is optimum for the germination of pinyon pine when either rate of germination, percentage of germination within a period of 30 days or less, or average time of germination is used as a criterion.

2. The largest and fastest-growing seedlings were produced at 70° F. The growth rate and total length of seedling were much less at 40, 55, 80, and 90° F.

3. Greatest weight losses by respiration occurred at 70° and 80° F. and there was practically no loss at 40° F.

4. Average growth per unit of weight lost, which can be considered a measure of efficiency, was greatest at 55° F., although the difference between results at this temperature and 70° F. were not statistically significant. The maximum probably lies between the two points.

5. Practically all the endosperm was used in seedling production at temperatures of 70 and 80° F. but at higher and lower temperatures considerable portions remained unused. The amount of the endosperm used corresponds approximately to the length of the seedling produced.

6. Soil temperatures can play an important part in determining the survival of young coniferous seedlings.

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Determining the Solid Wood Volume of Four-Foot Pulpwood Stacks

This paper contains a table from which the accuracy of a cruise can be obtained if the following factors are known: (1) percentage of cruise, (2) area cruised, (3) coefficient of variation between sampling units. The coefficient of variation is uniformly defined for different cruising designs and it is shown how it is calculated for a given cruise.

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IN THE pulp and paper industry the importance of apportioning production costs to their proper sources makes it increasingly necessary to devise a simple method of determining the solid cubic contents of wood in stacks. One such method and its use was described by Cecil H. Keepers in "A New Method of Measuring the Actual Volume of Wood in Stacks," in the January 1945 issue of the JOURNAL OF FORESTRY.

The physical characteristics of wood and the difficulties in purchasing properly fitted wood to a minimum diameter limit, especially during the past few years, tend to give great variance to the actual cubic contents of solid wood obtained from a rough cord. To obtain an average volume figure for solid wood per four-foot cord, against which costs can be applied, requires an inexpensive, simple, and accurate method of calculation. The old method of measuring both end diameters inside the bark of every stick in a stack, and thus finding the volume of each stick, is time consuming and expensive when samples of sufficient size are obtained.

A method of determining volume by photographing portions of stacked wood and wood piled on trucks and railroad cars has been in use by the Brown Company since 1945.[1] At this time, various methods were developed and tested. It was suggested that since a system of counting dots on aerial photographs to obtain percentage of areas of fields and open land had proven satisfactory, the same system might well be applied to stacked wood to find percentages of wood, bark, and space. This system has been in use for three years; it can be applied at relatively low cost, and its accuracy has been proven both by water immersion tests and tests using volumes obtained by measuring end diameters inside bark.

[1]The author is indebted to the management of Brown Company for permission to publish this information, and to the staff of the Photographic Division and Woods Department for valuable assistance.

Grateful acknowledgment is also extended to the statisticians of the Northeastern Forest Experiment Station, Upper Darby, Pennsylvania, for assistance in compiling data and in statistical procedure.

The principle of the dot count system is to find the relation in percent between the solid wood and the space and bark in a stack of rough pulpwood. First, photographs are taken of stacked wood where the final scale for that wood is given. (A Kodak Retina No. 1, 35 mm camera has been used with satisfactory results.) In all samples the camera is positioned at the same distance from the stacks, whether they are in the woods, on trucks, or on railroad cars. Consequently, apparent distortion is the same in all prints, and makes no difference in the dot count as distortion of wood on the print is in the same proportion as the distortion of space and bark. Secondly, the photographs are printed on glossy paper. Thirdly, white dots, equidistant from each other are printed over wood, bark, and space when the photographs are enlarged (Fig. 1).

Using a Dot Template

A dot template is made by drawing 200 equally spaced dots in the form of a rectangle with 10 rows of dots and 20 dots to the row. Originally, 100 equally spaced dots were used on one photograph. Large dots were used because they were easier to count, but they were difficult to classify as being on wood or bark and space. Hence, 200 dots were used on one photograph and the size of the dots was reduced to a minimum, the smallest magnitude possible to read with the naked eye. This proved almost completely to eliminate borderline cases. Questionable dots are easily classified by the use of a magnifying lens.

Using three photographs per sample, the person counting offsets the rectangle of dots one-third the distance between dots on each photograph; thus a total of 600 dots per sample is counted. The drawing on which the dots are photographed and printed is made on a scale 20 inches long, 10 inches wide and the dots are 1/40 of an inch in diameter. Another photograph is taken of this print and reduced to a rectangular negative template about 1-3/32 inches by 9/16 inches. The dots on the final template are invisible to the naked eye.

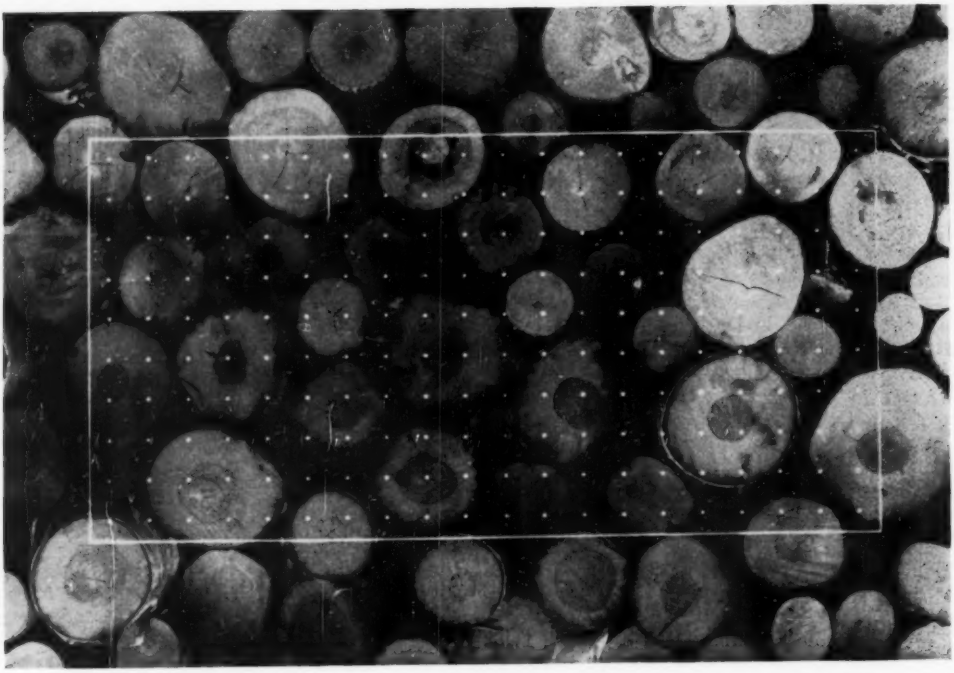

FIG. 1.—Photograph of stacked pulpwood showing positioning of the template. The white dots have been made larger than those actually used in order to show prominently in the print.

FIG. 2.—Positioning of lens and photograph preparatory to counting dots.

The more dots contained on the template, the better the sample. However, a print covered with dots would be useless as neither the dots nor the bark, wood, and space would be distinguishable. Moreover, too many dots on one print may cause eye strain in the person counting them for a long period of time. This is the reason for offsetting the dot template on the sample three different times. As previously mentioned, the template is moved an equal distance each offset, so that no dot will fall on the same point as in the previous print. In this manner 600 dots per photograph, or per sample, are counted. Photographs are enlarged to 5 in. by 7 in. In most cases, on prints of this size, wood can easily be distinguished from bark and space.

After the prints are developed (the dots show white on the prints), they are placed in a frame with a magnifying lens in position (Fig. 2). The dots are counted through the lens, which procedure facilitates both the count and the decision as to whether questionable dots actually fall on wood or on space and bark. The counter determines the number of dots, or half dots, in each row that falls on solid wood, and records this number at the end of each row. When he has counted these dots, he proceeds to the next print. After completing his count on the three prints of the same sample, he totals the number of dots on solid wood and divides by 600 (total number of dots in the sample), and the resulting figure is the percent of solid wood in the sample. This percentage figure is multiplied by 128 (a stacked cord of 4-foot pulpwood is contained in 128 cu. ft. of space) to give the number of cubic feet of wood as represented by the sample.

One person can count from 75 to 100 prints per day, but the best practice has been to count for an hour or so and then rest the eyes. As a certain amount of figuring and recording is required after each count, the person counting can perform this work in the interim. When the sampling is of peeled wood the problem is much simpler, as there is no bark with which to contend. However, in rough wood the enlarged print and the magnifying lens show up the bark clearly.

How The Data Are Used

Stacked pulpwood is scaled by measuring outside dimensions of corded piles and figuring the stacked cubic feet contained in these piles. The scaler makes deductions from this gross stacked measure for cull and for knots and loose piling.

To determine the amount of solid wood in a cord scaled as the company pays for it, the scaler proceeds as in the following example:

The photograph covers approximately 0.50 cords and shows 60 percent solid wood. In this section of the stack, the scaler has made a deduction of 0.02 cords for cull and another 0.02 cords for knots and loose piling. As cull is contained wholly in solid wood and cannot be separated from sound wood in the photograph, a proportionate amount must be taken from the solid wood content shown by the photograph as is taken from the gross contents by the scaler.

SCALER		PHOTO
0.50 cords gross x 60 percent	=	0.300 cords wood & cull
.02 cords cull x 60 percent	=	.012 cords cull
0.48 cords		= 0.288 cords solid wood

Next, the scaler makes a deduction for knots and loose piling which the dot count has taken out of the stack as only dots on wood were counted.

Scaler		Photo
0.48 cords contains .02 cords knots and loose piling	=	0.288 cords solid wood
0.46 cords net per scale contains x128 cubic feet		0.288 cords solid wood x128 cubic feet
58.88 cubic feet net contains	=	36.864 cubic feet solid wood

or 80.14 cubic feet per cord solid wood as scaled for payment.

An important use of the data on the cubic-foot content of solid wood per cord is to determine the number of cords necessary to produce a ton of pulp. This is done at the mill by finding the number of pounds of wood per cubic foot by weightometer. By multiplying pounds per cubic foot by cubic feet per cord, one determines the pounds per cord. Knowing the total weight of wood weighed on the weightometer as the wood is entering the mill and the total weight of the product manufactured, he then may determine the number of cords per ton.

Wood for the mills is obtained from two different sources. Purchased wood is bought from small producers, farmers, and wood dealers scattered over three states. "Operated wood" is cut on company-owned lands, or on land where a company has stumpage rights, by company-operated camps or jobbers. The size of wood and quality and methods of fitting vary considerably over the territories from which it is cut. Results of one year's sampling are shown in the Table 1.

TABLE 1.—AVERAGE CONTENTS OF WOOD, BARK, AND SPACE IN GROSS CORDS FROM VARIOUS ZONES AS SHOWN BY SAMPLES

Zone No.	Percent solid wood	Cu. ft. solid wood	Percent bark	Cu. ft. bark	Percent space	Cu. ft. space
SULPHATE SOFTWOODS[1] (Pine, hemlock, larch, cedar) Average pieces per cord = 82.97						
2	64.58	82.66	9.33	11.94	26.09	33.40
6	63.75	81.60	13.66	17.48	22.59	28.92
7	67.41	86.28	11.84	15.16	20.75	26.56
8	64.41	82.44	15.17	19.42	20.42	26.14
11	60.83	77.86	14.25	18.24	24.92	31.90
12	67.83	86.82	11.50	14.72	20.67	26.46
16	67.41	86.28	13.67	17.50	18.92	24.22
17	65.50	83.84	12.42	15.90	22.08	28.26
18	64.83	82.98	13.50	17.28	21.67	27.74
24-25	66.92	85.66	13.75	17.60	19.33	24.74
Average sulphate softwoods, 41 samples	65.35	83.65	12.91	16.52	21.74	27.83
SPRUCE AND FIR[1] Average pieces per cord = 100.73						
2	67.25	86.08	13.08	16.74	19.67	25.18
6	66.00	84.48	13.33	17.06	20.67	26.46
7	72.66	93.00	13.42	17.18	13.92	17.82
8	69.58	89.06	13.50	17.28	16.92	21.66
11	64.17	82.14	15.33	19.62	20.50	26.24
12	66.83	85.54	13.25	16.96	19.92	25.50
16	67.33	86.18	12.50	16.00	20.17	25.82
17	68.16	87.24	12.84	16.44	19.00	24.32
18	67.83	86.82	12.84	16.44	19.33	24.74
19	66.50	85.12	12.25	15.68	21.25	27.20
Average spruce and fir, 50 samples	67.63	86.57	13.23	16.93	19.14	24.50
HARDWOOD[1] (Beech, birch, maple, ash) Average pieces per cord = 87.28						
2	63.25	80.96	10.50	13.44	26.25	33.60
6	62.33	79.78	13.59	17.40	24.08	30.82
7	64.50	82.56	13.83	17.70	21.67	27.74
11	62.92	80.54	13.67	17.50	23.41	29.96
12	64.75	82.88	11.66	14.92	23.59	30.20
16	57.75	73.92	14.50	18.56	27.75	35.52
17	61.75	79.04	12.58	16.10	25.67	32.86
18	63.91	81.80	13.59	17.40	22.50	28.80
19	59.25	75.84	10.66	13.64	30.09	38.52
Average hardwoods, 49 samples	62.27	79.71	12.73	16.29	25.00	32.00
Average all species	65.08	83.31	12.96	16.58	21.96	28.11
SPRUCE AND FIR[2] Average pieces per cord = 49.80						
Rangeley Lakes, Me.	69.00	88.32	11.53	14.77	19.47	24.91
WHITE PINE[2] Average pieces per cord = 34.64						
Rangeley Lakes, Me.	74.43	95.26	10.33	13.23	15.24	19.51

[1]These samples were mostly wood from second growth stands purchased from separate owners.

[2]Wood cut from old growth stands shows a much larger yield in solid wood (Fig. 3).

The locations from which wood is purchased are divided into zones or geographical territories. All production from various operators in each zone is sampled at regular intervals. The cubic-foot content per cord for each zone is weighed and used as a basis for determining the actual cost per cord for that zone in terms of a standard number of cubic feet in a theoretical cord. Also, the cubic-foot contents per cord received from different dealers is used as a basis for letting contracts and setting prices to be paid per cord. Cost of operated jobs are compared in a like manner.

Photographs obtained in sampling are valuable to management for comparing size, quality, and fitting of wood from various jobs and locations. They also show the condition in which the wood is received at the mill, on trucks, or railroad cars, for scaling.

Sampling by the dot count method during a period of two years has given results with a standard error of less than one percent, plus or minus. On production for the first half of 1948, the results were as follows:

Species	Standard error (Plus or minus) percent
Hardwood (Beech, birch, maple and ash)	0.38
Spruce and fir	0.29
Sulphate softwoods (Including pine, hemlock, tamarack, and cedar)	0.75

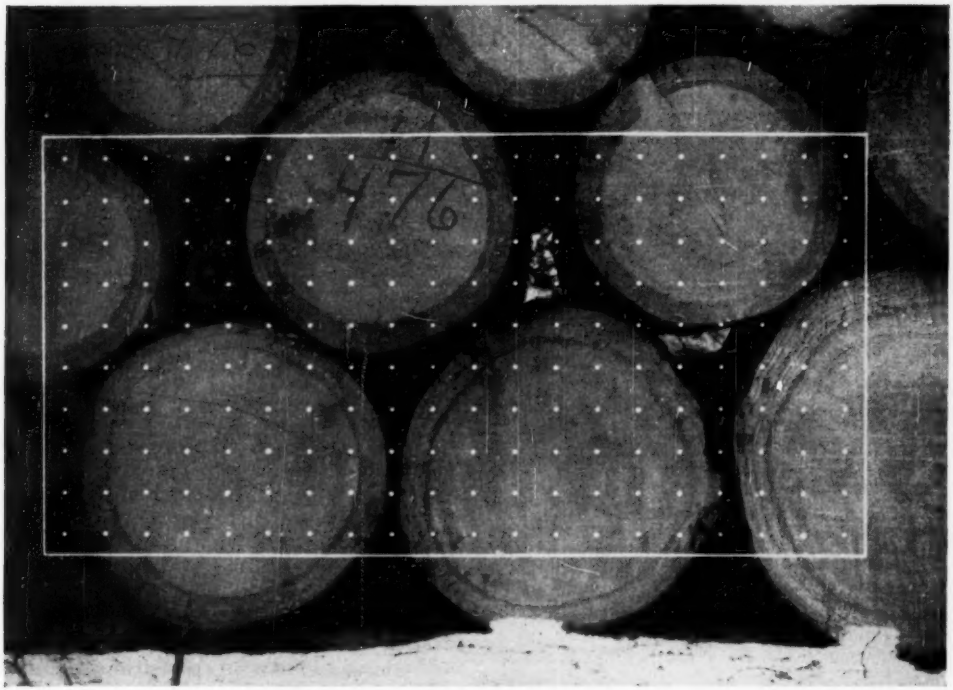

FIG. 3.—Sample showing greater number of dots on wood in old growth White Pine.

Results of Airplane Pellet Seeding on Indian Reservations[1]

This paper discusses the method and results of airplane pellet seeding on range lands in Arizona and New Mexico under the jurisdiction of the Bureau of Indian Affairs, U. S. Department of the Interior.

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A TOTAL of 90,000 acres was seeded between April 1946 and August 1948 on four Indian reservations: the Papago in south central Arizona, the San Carlos in east central Arizona, the Hopi in northeastern Arizona, and the Navajo in northeastern Arizona and northwestern New Mexico. These plantings were made in areas selected because of different conditions: the desert shrub at an elevation of approximately 3,000 feet on the Papago, the desert foothill grass type including some malpais area at an elevation of 4,500 on the San Carlos, the flood plain grass land type at an elevation of approximately 5,500 feet on the Hopi, and the forest types in Chuska Mountain area at an elevation of approximately 8,000 feet on the Navajo.

All these areas were seeded by airplane using pellets containing various species of grass and legume seed. The pellets were a mixture of clay, seed, rodent-insect repellent, and growth promoting chemicals pressed together to make a small hard ball. The clay was obtained near the area where the seeding was in progress and the pellets were manufactured at the flight strip.

The mixing soil was chosen on the basis of suitable colloidal content and cohesiveness, and contained not less than 25 percent clay. Quartz grains were undesirable because they tended to abrade the pellet making machine.

Pellets with a high proportion of coarse material are less firm, break into fragments more readily, shed "dust" from the edges, soak up water rapidly, and lose all strength and rigidity at once when wet. On the other hand, pellets made from pure clay or shale are considerably harder, even have a "shine," are actually difficult to break when thoroughly dry, shed less "dust" from the edges, do not break into fragments easily, soak up water rather slowly, and retain considerable strength and rigidity even when wet. The pellets were ¼-inch or ⅜-inch in diameter, depending on the size of seed used. The number of pellets per pound varied between 1,450 to 1,500 for the ¼-inch size, and 420 to 500 for the ⅜-inch size.

The number of seeds per pellet varied from 2 to 59. When more than 8 seeds of smooth brome were placed in the ⅜-inch pellet one broken seed resulted because the seeds are long and large. Counts of sweet clover in ¼-inch pellets ran from 3 to 20, and averaged 10. Timothy counts ran from 4 to 59 seeds in the ¼-inch pellets, and averaged 28. The pelleted seed was submitted to state and federal seed testing laboratories and experiment stations to determine the effect that pelleting had on viability. Actual mechanical injury to wheat grass, brome, and similar seeds decreases their viability by varying degrees. Crested wheat when tested by the state seed analyst at the University of Wyoming dropped from a germination of 80.68 percent before, to 14.7 percent after, pelleting. Smooth, small, and hard seeds were not mechanically injured to any appreciable extent.

The moisture in the clay surrounding pelleted seed may have some effect on decreasing viability. It is not feasible to prepare pellets much in advance of actual distribution because of seed deterioration. Because of the weight of pelleted seed, its transportation for great distance is impracticable, hence seed must be pelleted at the scene of operations.

Airplane loads varied from 800 to 1,600 pounds of pellets depending on altitude and terrain. Each plane-load contained from 2 to 32 pounds of grass seed. The pellets were scattered in a strip 100 to 180 feet wide, and 3½ to 4½ miles long.

[1]This paper is based on information and cooperation secured from the Soil and Moisture Conservation Operations and Forestry Divisions of the Phoenix district and Washington offices of the Bureau of Indian Affairs; the personnel of the four Indian reservations; various bureaus of the Department of the Interior, particularly the Bureau of Reclamation and the Fish and Wildlife Service; the Southwestern Forest and Range Experiment Station; the Soil Conservation Service; and the University of Arizona.

One plane-load usually covered an area of 18 to 48 acres per flight.

The rate of seedling was one pellet per square foot with an average of 6 to 8 seeds per pellet.

The rodent repellent used was dry lime-sulfur. In laboratory studies of pelleted seeds in Denver by the Wildlife Research Laboratory, it was found that white rats readily break up the pellets for the seed they contain. No noticeable benefit was observed of the so-called repellent contained in the pellets. On the various reservations technicians found that rats gathered up the pellets containing the repellent and ate the seed with apparent relish.

The growth promoting material mixed in the pellets was chiefly ammonium sulfate; the amount mixed in each pellet is not known, but had to be restricted to prevent damage to the seed.

Penetration of pelleted seed into soil was practically nil. In early flight tests made at the Papago Reservation in the spring of 1946 the plane was flown over a range pond to test the spread of pellets and the pattern of distribution. Several Indians and Indian Service personnel were stationed around this pond to observe the results. Waves washing the soil surface around the pond kept it extremely soft and wet. The tracks of small kingfishers and other birds were clearly discernible in this very soft soil, but pellets did not penetrate it at all. They hit the soil at an acute angle and bounced, leaving merely slight dents or depressions. Penetration has been secured on the sides of very loose gopher mounds, and on the sides of furrows or ridges of plowed or listed soil where the pellets hit the soft surface at an angle of about 90 degrees. In the latter case, however, the pellets were visible being merely embedded in the loose soil.

Results on the Papago Reservation

The airplane seeding on the Papago Reservation covered an area of 10,000 acres of desert shrub type in the area known as the San Vicente Ranch. The elevation varied from 2800 to 3400 feet above sea level. The seeding was done between the dates of April 25 and June 24, 1946. The grass seeds planted were Lehmann lovegrass and sand dropseed in the ratio of 2 to 1. Summer rains followed ten days after the completion of the seeding. The amount of moisture and distribution was very favorable during the first summer. Winter rains were below normal but were sufficient to maintain winter annuals and permit growth of Lehmann lovegrass. Summer rains during the following year (1947) were approximately one inch below average. These rains began late and the one-inch deficiency occurred in July. However, summer growth of native grasses and Lehmann lovegrass was normal. The second winter season and the third summer were dry. The severity of the drought restricted growth of native plants and Lehmann lovegrass.

In November 1947, the Southwestern Forest and Range Experiment Station cooperated in planning the sampling procedure which consisted of 448 random samples of 100 square feet each. The San Vicente area was divided into seven plots for easier compilation. The sample was made on Lehmann lovegrass only, as it was exotic to the area, whereas sand dropseed was native. The results of this sample showed a variation from 7 to 116 plants per plot. The average for the 10,000 acres was 75 plants per acre. The rate of seeding varied from 175,000 to 250,000 Lehmann lovegrass seeds per acre. The sampling was completed 16 months after the seeding, during which time the Lehmann lovegrass had gone through three growing seasons: summer 1946, winter 1946-1947, and summer 1947. The Lehmann lovegrass plants found in November 1947, had become established, had maintained themselves, and had produced seed. All the plants that had germinated on barren, slick soils had disappeared.

The technicians at the Papago Agency have concluded that the following precautions should be observed in any additional seeding on the Papago Reservation.

1. Soil preparation should precede seeding in order to retain sufficient moisture to maintain plants once established.
2. Time of distribution of seed must be coordinated with the local precipitation pattern.
3. Areas seeded must be under range management to give protection to newly established plants.

Results on the San Carlos

The airplane seeding on the San Carlos Reservation covered an area of 20,000 acres. The seeding was done between August 14 and October 14, 1946. The area comprised two tracts: one of approximately 2,500 acres, known as the Paymaster Area; the other, a strip west of Ash Creek Ranch.

Approximately 1640 pounds of sand dropseed, 800 pounds of Lehmann lovegrass, and 50 pounds of weeping lovegrass were sown in a mixture. In addition, 28 acres were quadruple disked and drilled with pellets adjacent to Ash Creek Ranch, of which 18 acres were drilled to Lehmann lovegrass and 10 acres to weeping lovegrass at an approximate depth of one-half inch. As a check, 4 acres were drilled to Lehmann lovegrass not in pellet form between August 1 and 15, 1946.

During October, a few scattered patches of Lehmann lovegrass were found in the area which was drilled with pellets. The stand was extremely poor and spotty. However, these plants produced seed before the first killing frost. In the area sown by plane, occular observation in September 1947 by San Carlos technicians failed to show a single specimen of Lehmann lovegrass.

Results on the Hopi and Navajo

The airplane seeding on the Hopi and Navajo Reservations was completed in four phases. The first and second phase were on the Jeddito-Polacca-Wepo food plains, with 10,000 acres in May and June 1947. The first seeding was made with crested and western wheat; the second with crested wheat and sand dropseed.

The above area was examined in October 1948 by a group of representatives from various bureaus of the Department of Interior. The following is an excerpt from Warren V. Turner's report to the regional planning engineer of the Bureau of Reclamation relative to his observation on the Polacca-Wepo water spreading area.

> Friday was spent on the Polacca-Wepo water spreading areas and on an examination of structures and plantings in Keams Canyon. The Polacca-Wepo spreading area was seeded to grass a couple of years ago by airplane using the seed pellet method, but the results presently observable cannot be considered even partially satisfactory. A scattering of crested wheat grass was found in a part of the spreading area that appeared to be the result of the airplane seeding. A point noted that may be of significance was that the great majority of the crested wheat grass plants were within clumps of the native galleta grass indicating that the falling seed may have lodged in the base of the already growing clump and germinated and developed under this protection. Very few specimens of the planted species were found that appeared to have established themselves on a bare ground surface. Western wheat grass or blue stem, which was also included in the planting, is a commonly occurring native in the area so its occurrence is meaningless as far as the success of pellet seeding by airplane is concerned. No specimens of weeping lovegrass, the species that was used as a tracer, were found.

Incidentally, the crested wheat observed on this area may have been from seed washed in from above since the Keams Canyon drainage area, which contributes a considerable portion of the run off diverted from the Polacca, has crested wheat growing within it. From the particular pattern of these plants, however, there was little doubt that they had been established through aerial seeding.

The third and fourth phases were in the Chuska Mountain area. This seeding area is located on the Chuska Mountain plateau just east of the New Mexico-Arizona state line, 30-60 miles northwest of Gallup, New Mexico. The topography is gently rolling to rough, with timbered areas interspersed with open parks, dotted with small lakes. The timber is dense stands of aspen and spruce-fir, and open stands of ponderosa pine. There is no vegetation under the ponderosa pine, although this type is capable of maintaining medium grass stands. Open parks have the greatest possibilities for revegetation as the soil is relatively deep and erosion losses light. The parks are now occupied by weeds, sedges, and shrubs of relatively low palatability. No rainfall records are available, but similar mountain areas in the Southwest where records are kept receive from 20 to 28 inches annually. In eight out of ten years, the rainfall is probably sufficient to grow grass from seed.

In the third phase 24,000 acres were seeded during the period October 25 to December 14, 1947. Some unpelleted seed was planted between January 3 and 7, 1948 on deep snow.

In the fourth phase 16,000 acres were seeded during June and July of 1948 with pellets containing various amounts of crested wheat, smooth brome, sweet clover, and timothy. Some sweet clover and timothy came up during the summer of 1948 around the air strip where there was a greater concentration of seed, and in other disturbed areas. Some of the timothy produced seed during the fall of 1948. Generally, no evidence of establishment can be found on open ground, but it is too early to make any reliable conclusions at the present time.

The preliminary opinions of Navajo technicians on airplane seeding to date are as follows: (1) The results from this operation are directly proportional to the amount of ground preparation, other factors being equal; and (2) seeding with unpelleted seed gave approximately the same results as seeding with pelleted seed. More seed was used per acre in the former, but the

total cost for the two types of operation was approximately the same.

The following excerpt is quoted from the 1948 annual report.

The aerial reseeding project on Chuska Mountain, started in 1947, has been completed this year. Although it is too early to make final predictions, careful observation leads to certain deductions. A project of this kind to be successful must receive full support from everyone concerned. Fine cooperation has been received from district supervisors, range management division, and a majority of the range users. Thus, the following statements are made. It is difficult to reseed successfully large acreages of land due to weather, rodents and use. In order to have adequate stands, more seeds per acre are required. The planting date is very important and can be better managed on smaller plantings. Land preparation appears necessary as a high mortality of seedlings results otherwise. Grazing can be handled better on smaller seeding units. Better distribution of seed is desirable. It appears that planting by individual users would be more efficient and economical operation.

Abstract of Master's Thesis

Relationships Between Density and Basal Area of Natural Loblolly Pine Stands in the Georgia Piedmont. By Herbert L. Morgan. University of Georgia. June 1947.

THE object of this study was to determine the maximum basal area capacity of the Cecil soil series in the Georgia Piedmont with respect to loblolly pine, and to find suitable thinning practices for giving a more exact method of producing the maximum volume growth of this species.

The data for this thesis were collected from six counties in the Georgia Piedmont on plots that had regenerated naturally on soils of Cecil series.

The method used was based on increment as related to basal area rather than the number of stems per acre. Growth data for the past five years and age were obtained. Determinations of the basal area and increment per acre of natural loblolly pine stands were made. Bark thickness included the d.b.h. measurements and the d.i.b. was used to obtain true growth increment. In figuring total age, four years were added to the breast-height count. The average area of increment for the last five years was plotted over average total basal area.

It was noted from the peak of this graphical representation that the carrying capacity per acre is 71.0 square feet. The maximum productive capacity may be obtained five years hence. By plotting the basal area over area of increment for the past five years, best results were obtained when basal area was broken down into 15 square-foot classes. A rule of thumb for thinning was determined by using the constant difference of 1.83 in the desired spacing multiplied by the average diameter in inches and using this figure as the number of feet for desired spacing.

Southern Pine Beetle Control on Norris Reservoir Lands

The Southern pine beetle attacked a small stand of timber on TVA lands at Norris Reservoir, Tennessee, in 1945. Moving from this point in a series of irregularly spaced jumps on a narrow northeasterly path, the infestation struck at 466 points, killing a total of 231 acres of timber on its 16-mile course, before it was brought under control. The characteristics of the infestation and the costs, techniques, and effectiveness of the control measures applied are presented.

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DURING the late summer of 1945, a three-acre stand of old field scrub pine (*Pinus virginiana* Miller) and shortleaf pine (*Pinus echinata* Miller) was observed to have died recently. The 45-year-old stand, on a 25-percent slope with a southern exposure, formed a part of the Tennessee Valley Authority's reservoir properties and the Clear Creek watershed near Norris, Tenn. Investigation indicated that death was caused by the southern pine beetle (*Dendroctonus frontalis* Zimm.).

As a first step toward preventing the spread of the infestation, a timber sale contract was let for the removal of the dead and infested sawtimber. This sanitation harvesting began in November 1945, and was completed in March 1946. A total volume of 23,435 board feet was removed from the three-acre area, 45 percent of which was removed during November and the remainder during March. Inclement weather halted the operation during the intervening months.

Along with this sanitation harvesting operation, winter temperatures and other natural agents offered some promise of effectively checking the infestation. Findings reported by Beal[1] in 1933 indicated that air temperatures of 10° F. and lower even for short periods result in heavy mortality among both larvae and adults.

During the spring and summer months of 1946, the area surrounding the infestation was checked frequently but no further infestation was observed. However, late in the summer of 1946 new infestations appeared in surrounding areas on TVA lands and adjacent private lands. An aerial reconnaissance over the Norris Reservoir lands disclosed 12 separate units of infestation in addition to 5 infested units observed during routine field work. Units ranged in size from a single infested tree to areas of several acres.

With these definite indications that the infestation was spreading, it was necessary to apply further control measures in order to protect pine plantations, merchantable pine stands, and investments in forest experiment projects. While the most economical and effective control measures were being determined in cooperation with the Bureau of Entomology and Plant Quarantine, TVA made a detailed field investigation of all known infested areas, principally to determine the extent of infestation, age of the stands, sawlog volume infested and killed, and factors involved in salvaging the merchantable material. As of October 30, 1946, 31 infested units were found, ranging in size from 0.1 acre to 6 acres and comprising a total of 49 acres. The beetle attack occurred in trees ranging from less than ten years of age to overmature trees. The total sawlog volume killed up to this date amounted to approximately 224 M board feet, including both scrub and shortleaf pine.

Control Measures

After study of the problem and consideration of the recommendations of the Bureau of Entomology and Plant Quarantine, each unit was classified and one and/or a combination of the following control measures were adopted:

1. Fell, pile, and burn infested trees of sapling and pole size where conditions permit safe use of fire.

2. Fell, limb, and buck infested trees of sapling, pole, and sawlog size where conditions do not permit safe use of fire. Spray infested portions with orthodichlorobenzene dissolved in four to six parts of kerosene, depending upon the thickness of the bark. Details and plans for these control measures were completed and put into effect January 13, 1947.

The first method of treatment proved particularly effective in sapling-size trees and was applied in a number of plantations. Fire breaks

[1]Beal, J. A. Temperature extremes as a factor in the ecology of the southern pine beetle. Jour. Forestry 31:329-336. 1933.

were constructed around the piles and the work area was patrolled to keep the fires under control and to avoid scorching uninfested trees.

Where burning was not feasible, felling and bucking, followed by an application of orthodichlorobenzene in kerosene, proved to be entirely effective. A solution of one part of orthodichlorobenzene to five parts of kerosene was applied throughout except on experiment projects where the solution used was one to four. Under average conditions, two men spraying kept pace with eight men felling and bucking. Both stumps and tree boles were treated. Bucking the tree into logs facilitated the application of the solution to all surfaces. The solution was applied with a three-gallon portable spray can equipped with a pressure pump and mist nozzle.

As work progressed, field inspection located new infested units. However, not until July 1, 1947, after 372 infested units, ranging in size from single trees to 24 acres, had been found was there any tangible evidence of progress in stopping the spread of the epidemic. Thereafter the number of new infested units found steadily decreased.

To determine the effectiveness of the control measures, a recheck of 50 treated units was made in August 1947; and 41 units, or 82 percent, showed complete control of the beetle after the first application. Beetles remained active on the remaining 9 units. Control measures were repeated on these units and any other remaining units where effective control had not been obtained. With these indications of effective results, work continued through June 30, 1948.

Individual reports were prepared on each unit of infestation treated. Table 1 presents a summary of these reports for the period January 13, 1947, to June 30, 1948. A total of 466 units were treated. (A unit was any beetle infestation not contiguous with another and might vary in size from a single infested tree to several acres.) Two hundred sixty-eight, or 58 percent of all units, were in sawlog stands having a significant volume of merchantable pine. To maximize salvage of sawlogs, infested units were clasified by location, distribution, and volume. Sawlogs totalling 758 M board feet were salvaged, amounting to 83 percent of the total sawlog volume and 95 percent of the accessible volume considered salvageable. Absence of a pine cordwood market precluded salvage of poles.

TABLE 1.—SUMMARY OF TREATED UNITS IN THE CONTROL OF THE SOUTHERN PINE BEETLE ON NORRIS RESERVOIR LANDS

Size class of unit	Number of units			Sawlog volume		
	Sawlog	Under Sawlog	Total	Total area	Access.	Inaccess.
					M bd.	*M bd.*
Acres	*No.*	*No.*	*No.*	*Acres*	*ft.*	*ft.*
Less than 0.1	153	126	279	14	34	40
0.1 to 0.4	50	51	101	17	53	30
0.5 to 0.9	22	9	31	17	25	15
1.0 and larger	43	12	55	183	684	29
total	268	198	466	231	796	114

Characteristics of Infestation

The infestation spread in a northeasterly direction from the vicinity of Norris, Tenn., and after a period of three years extended over an area of approximately 108 square miles. The infestation spread northeastward generally along the course of the prevailing winds. Norris Reservoir with its irregular shoreline and varying width, not exceeding one mile, offered no barrier to the continued spread of the beetles.

Beetle killed trees ranged from 2 to 26 inches in d.b.h. Generally, pure pine stands 2 inches d.b.h. and larger with normal to over-stocking were most susceptible to attacks and the infestation spread more rapidly in these stands than in mixed pine-hardwood stands. Beetle killed trees were found in concentric circles surrounding the original point of infestation in some cases. Other infested units were interspersed with isolated, vigorous, uninfested trees or groups of trees. The characteristic beetle entrance holes and reddish brown pitch tubes invariably were evident in greater number on scrub pine than on shortleaf pine. Pitch tubes were absent on some beetle infested or killed shotleaf pine, but boring dust was found in crevices of the bark and entrance holes distinctive of beetle attack.

From observations of this infestation, we believe that colder weather of longer duration than is usually experienced in eastern Tennessee is necessary to reduce materially the activity of the southern pine beetle. Air temperature records for the period December 1945 to February 1948 showed that the lowest temperature, 2° F., occurred during January 1948. The fact that the lowest temperature during the winter of 1945-1946 was 12° F. may have contributed to the spread of the beetle during the summer and fall of 1946. A 1947 low of 8° F. was recorded on February 8. However, warmer weather followed and a maximum temperature of 64° F.

for the month was recorded ten days later. The number of infestations increased rapidly during this month.

Insectivorous birds, especially woodpeckers, frequently served as indicators of beetle attack. Often birds seeking beetle larvae and adults removed so much outer bark that sawlog size trees acquired a distinguishing buckskin appearance and the amount of spray solution necessary to obtain effective penetration of the bark was appreciably reduced. That woodpeckers can be important agents of natural control in reducing the population of bark beetles was found also by Gobeil[2] in his study of the eastern spruce beetle.

Cost

The total direct cost of treating 466 units of beetle infestation was $21,119, representing an average expenditure of $91.50 per acre for the 231 acres that required direct control. The total cost included salaries and wages (76 percent), travel, boat rental, chemicals, and small tools. Chemical control required 440 gallons of orthodichlorobenzene costing $424.31, and 2,258 gallons of kerosene costing $272.47.

Income of $9,279 was realized from the sale of 758 M board feet of salvaged sawtimber. Sale prices for stumpage and undecked logs ranged from $6.50 to $15.10, and averaged $12.24 per M board feet. Degrading caused by blue stain was responsible for the low amounts received for some stumpage. When the revenue from salvaged timber was deducted from total expenditure, the net cost of the beetle control operation amounted to $11,840.

Beetle control is, of course, properly allocated as a protection cost against the total forested acreage endangered by the attack. On a conservative basis, limiting considerations to TVA-owned forested lands on Norris Reservoir, the protection cost can be allocated to 87,000 forested acres, 14,000 acres of which were pine plantations, and the remainder pine, mixed pine-hardwoods, and hardwood forest types. With a merchantable pine sawtimber volume conservatively estimated at 66,420 M board feet, the net beetle control cost was $0.18 per M board feet. In terms of the commercial timber values alone this cost appears to be entirely reasonable and it is further justified by an extensive public recreation use that this area serves which cannot be measured in dollars and cents.

Future Course of Action

Southern pine beetle infestations on TVA lands of Norris Reservoir and surrounding areas have been reduced through direct control measures and natural causes to such an extent as to be no longer of epidemic proportions. However, in view of the continued presence of the beetle in this area, TVA is proceeding with the application of control measures under the following plan:

1. Control measures will be applied to forest experiment projects proportionate to the project values involved.
2. Merchantable stands of pine pulpwood or sawtimber where the beetle is active will be given priority in selling stumpage. Where immediate sale of the stumpage cannot be arranged, control measures will be applied to minimize damage to the pine growing stock.
3. Control measures applicable to sale areas will be in proportion to the value of the residual stand.
4. An appraisal will be made to determine control measures to be applied, taking into account the probable damage in relation to cost of control in all other areas of infestations.

It is not economically feasible and is probably impossible to eliminate the southern pine beetle from this area. Nevertheless, our experience indicates that a control program can reduce the destructiveness of the beetle, provided timely and effective measures are applied to prevent infestations from reaching epidemic proportions. This program requires forest management with proper silvicultural practice and constant vigilance in this locality, characterized as it is by a scattered distribution of pine in varied forest types. The thousands of acres of pine plantations now 8 to 14 years old are highly vulnerable to beetle attacks that can readily spread and cause complete destruction of this potential forest resource. Recognition of the risk and provision for reduction of loss by the southern pine beetle is essential to the forest management program for full realization of the productive forest resource in such areas as Norris Reservoir.

Summary

After southern pine beetle attacks had reached epidemic proportions on TVA lands, Norris Reservoir, the infested timber was treated with a solution of orthodichlorobenzene and kerosene

[2] Gobeil, A. R. Dendroctonus Piceaperda Hopk. A detrimental or beneficial insect? Jour. Forestry 39: 632-640. 1941.

or was piled and burned.

These measures applied to 466 infested units totalling 231 acres during the period January 13, 1947 to June 30, 1948 brought the epidemic under control.

The total cost of $21,119 was offset by an income of $9,279 derived from the sale of merchantable infested sawtimber. The net expense of $11,840 was considered a protection cost to insure pine sawtimber production, and when prorated against the estimated volume on reservoir lands amounted to $0.18 per M board feet.

Timely control action was found essential to prevent beetle epidemics and such a course of action has been inaugurated on TVA lands at Norris Reservoir.

Abstract of Master's Thesis

The Humus Content of Forest Soils on the Allegheny Watershed. By Alvin Kay Wilson. The Pennsylvania State College. 1949.

Data are presented on the average humus content of the *A* and *B* horizons of forest soils on the Allegheny River Watershed in western Pennsylvania and adjacent New York, based on field sampling from 46 well-distributed plots. Loss-on-ignition was used for organic matter determination in surface layers; a modification of Merkel's colorimetric method was used for mineral soil subhorizons.

Converted to total weight per acre and per acre-inch of horizon, the data were classified under several forest cover type groups and studied in regard to trend with stand age, differences in amount between cover type groups and under mor and mull humus layers.

Trends with stand age were obscured by wide individual variations, attributed, in part, to residual humus from previous stands. On the whole, differences in humus content under the several cover type groups were found to be not significant, as was the difference between the humus content of the combined *A* and *B* horizons under mor and mull humus layers.

However, the *B* horizon under the beech-birch-sugar maple type was found to average significantly higher than the same horizon under the combined softwood types, suggesting generally more favorable conditions under northern hardwood for downward movement of water.

The mor type of humus layer, while generally characteristic for softwood types, was found to occur frequently under some hardwood types, notably the northern hardwoods.

Some Effects of Fire and Cutting on Forest Soils in the Lodgepole Pine Forests of the Northern Rocky Mountains

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IN THE summer of 1948, while working on a flood control survey of the Missouri Basin, the authors had an opportunity to observe conditions in many of the soil types found in the lodgepole areas of the Northern Rocky Mountains. The area examined included northern Wyoming and southern Montana, east of the Continental Divide. Land use practices, their effects on soil conditions, and the resulting changes in surface run-off potentials and rates of soil erosion were particularly noted.

The observations were of necessity somewhat cursory. However, they do seem to indicate the existence of a situation which may be one of major significance in watershed management in this area—a situation which should be the subject of detailed research at the earliest practicable time. The present purpose is merely to promote discussion, point out some implications, and indicate the need for further study.

The Lodgepole Pine Area

The forests of this area are confined almost entirely to the higher elevations (above 6,000 feet). Lodgepole pine is commonly found in the middle zone of the timber belt at elevations from 7,000 to 9,000 feet. Ponderosa pine, juniper and similar more xerophytic types are found below and Engelmann spruce, alpine fir, and other associated species above, to timber line. Due to the generally shallow, rocky soil and the very short growing season found at these elevations, plus the growth characteristics of the species, lodgepole stands are usually slow growing. Trees of 18 inches d.b.h. or less are commonly older than 200 years. Annual precipitation in the lodgepole belt averages from 20 to 30 inches per year, of which half or more falls as snow. Slopes from 20 to 40 percent are common, and timbered slopes up to 100 percent are not unusual.

On an areal basis, lodgepole pine is the most important timber type within the region covered by the survey.

The soils observed varied in texture from "very fine sandy loam" through "gravelly sandy loam." Depths varied from less than one foot to more than six feet. Parent materials were of sedimentary (sandstones and shales), volcanic, and granitic origin. The surface or top soil was usually thin at the elevations and on the slopes where lodgepole pine was found. Occasionally stands including lodgepole pine were seen on soils of colluvial or alluvial origin with several inches of top soil. However, these stands were usually of mixed composition, probably due to invasion of less hardy species on the better quality site.

In this area of rough topography and heavy snow, vegetative cover plays a very important role in the retardation of surface run-off and erosion.

Basic Assumption

To determine the time required to produce the present soil condition, some method for dating the beginning of humus formation on the sample area was necessary. Most lodgepole pine forests have originated following forest fires that destroyed all the coarser organic material on the soil surface as well as much of the humus. In the majority of areas, evidence in the form of charred logs and particles of charcoal in the soil, below the present humus layer, gave positive proof of past heavy burns. Therefore it was assumed that practically all pure, even-aged stands of lodgepole pine examined had originated on mineral soil; that the humus measured was developed by the particular stand now occupying the site; and that stand age was indicative of the time consumed in development of the upper layers of the forest floor.

Stands sampled varied in age from seedling reproduction to decadent stands several hundred years old. Observations were made on all aspects, at several elevations, and in many soil types.

Effect of Fire

It is not difficult to see the effect on the soil after the protective cover of trees, litter, and humus has been destroyed by fire and subsequent exposure. Due to the sealing and baking effect of rain and sun on the unprotected surface and the puddling or compaction resulting from destruction of the porous organic matter in

the upper horizons, the bare soil soon becomes much more impervious to water. Even on gentle slopes, sheet erosion begins with the increased and accelerated run-off.

Fortunately, since lodgepole pine cones often remain closed after ripening and are remarkably fire resistant, seed sufficient to start a new stand usually survives. In the lodgepole country burns are normally soon covered by a thick stand of reproduction, often too thick for good growth. There are exceptions where, because the stand was below cone-bearing age at the time of the fire or because some agency destroyed the seed or seedlings before or after the fire, no reproduction is found. A few such areas were seen where, 30 years after the fire, reproduction was scarce or absent.

A number of observations were made in young stands that had come in after fires. Many of them were the thick, so-called "dog hair" stands. Where they grew on slopes (and almost all of this country slopes), erosion was active until a protective litter and humus cover developed. From the outside these patches of young lodgepole appear to have a much denser crown pattern than is actually the case. Only the most heavily stocked stands have a 75 percent crown density at 25 years of age. As a result, in the majority of young stands which have lower densities, much of the forest floor is exposed to the direct rays of the sun. A large part of the scanty needle fall from the young trees is quickly oxidized or is washed away by the direct force of rainfall on the unprotected earth. Thus the formation of a new humus layer is a slow process.

It appears that, even when a burn is fully restocked, 30 to 40 years must elapse after establishment of the stand before any appreciable litter and humus layer begins to form. At 50 years the organic layer is still patchy but accelerated erosion has greatly decreased. Litter depth averages about one-half inch. The partially decomposed F horizon averages about the same. An incipient H or A_1 horizon is beginning to form. The underlying mineral soil is still compact.

At 75 years the litter averages about the same depth as at 50 years but the F and H or A_1 horizons combined run from 1 to 1½ inches thick. Generally, the F horizon is the thicker. Stands 100 years old have a good humus layer with a ½-inch litter and a 1- to 2-inch absorbent layer of F and H combined. The mineral soil beneath usually contains some organic matter and is comparatively loose and moist.

Where old stands (over 200 years) have not deteriorated sufficiently to open the crown canopy, humus from 3 to 6 inches deep is sometimes found. The mineral soil beneath is generally loose and relatively moist. Obviously surface run-off and erosion are held to a minimum under such conditions.

Effect of Cutting

In many respects the effects on soils from timber cutting appeared to be very similar to those caused by fire. The condition of the underlying soil, and the humus depth, were apparently directly correlated with the intensity of cutting.

From observations in lodgepole pine stands that had been cut in a number of ways, the effect on the forest floor seemed to be the result of two things: (1) mechanical ground disturbance resulting in erosion and humus destruction; and (2) opening up of the stand so that increased sunlight, higher temperature, and increased air movement acted to oxidize the humus. Of these, the second apparently had the greater influence on the stand as a whole.

A number of observations were made in old-growth stands from which 25 to 50 percent of the volume had been removed 20 to 35 years ago. In many places haul roads and skid trails showed bare subsoil and were still eroding. The small areas between the trails, undisturbed by the actual mechanics of cutting and skidding, showed the results of opening up of the canopy in the thin needle and humus layer, and the dry and compacted soil.

Lodgepole pine crowns do not close up quickly after cutting, especially in stagnant old-growth stands. On some areas where half the volume had been removed 30 years ago, crown density at the time of this study averaged only 30-40 percent. Litter was generally less than ¼ inch deep, and total humus depth averaged between ½ and 1 inch. The humus covering was patchy, and what little remained on exposed spots appeared blackened and charred as the result of accelerated oxidation. In the more open areas very nearly all the organic matter was gone from the surface and active sheet erosion was apparent. Under small groups of trees, which had been left intact and where no skidding had taken place, the humus resembled that in an undisturbed old-growth stand; it formed a 2- to 3-inch protective mat that was underlain by a

friable mineral soil. Conditions similar to these and showing all stages of site deterioration can be seen along road clearings throughout the lodgepole zone.

Stands were examined that had been under management 30-40 years and that had been progressively thinned for corral poles, fence posts, and house logs. Stocking was fair to good, the trees were growing well, and the stands would be classed as good on a silvical basis. The forest floor beneath them, however, was covered by a patchy, thin humus layer. Soil washing was active in spots and the mineral subsoil was compact.

On areas which had been clear cut some years ago, the humus had generally completely disappeared. The only exceptions were where grass had come in soon enough after cutting to afford some protection. In such places some of the original humus remained and had been supplemented by the formation of a grass-root humus. In no case seen, however, did this humus layer approach in depth that of the uncut areas, nor was the underlying soil as free from compaction.

From observations made on a variety of sites, it is evident that the amount of crown canopy that can be removed without causing serious deterioration of the forest floor is dependent on many factors. Among these are degree of slope, aspect, soil type and local climate.

The harmful effects on humus and soil condition resulting from fire and from cutting apparently differ only in degree and length of time for accomplishment.

Research Needed for Proper Planning

Throughout much of the area discussed in this article watershed values are of prime importance. Since the economy of a great area, much of it many miles downstream, is completely dependent upon water from the mountain snowfields for agricultural and domestic use, all other uses of these mountain lands must be subordinated to that of water production. Much of the water used is taken directly from the streams without storage or treatment. It is essential that regularity of flow and water quality as well as quantity be maintained at the highest possible level. The factors of quality and regularity of flow are especially influenced by the rate of infiltration and percolation of the water through the soils of the watershed. These in turn are greatly influenced by soil condition.

In view of our observations, several questions arise as to proper management methods:

1. Does the obvious deterioration in soil condition after fire sufficiently affect the water-producing capacity of the land to justify greater expenditures of money for fire prevention and control? If so, how much?

2. Are we justified in waiting 50 years or longer for a burn to restock naturally where we know an additional 100 years will be necessary to recondition the soil, if there is any soil left?

3. Where natural restocking is slow, should we seed burns to grass which may give quick protection, rather than wait for the much slower protection which will come through tree planting?

4. Does site deterioration inevitably follow logging in lodgepole pine? If so, to what degree under various combinations of cutting intensity, altitude, aspect, slope, and soil type?

5. Where shall we strike the balance? What amount of loss in water-producing value is economically justifiable to produce what amount of timber value?

6. Where cutting in old stands is to be done, is it better to clear cut and get a new fully stocked stand as soon as possible even though site deterioration may be very severe for a time? Or do we prefer the much slower deterioration which takes place under partially cut stands, but where reproduction is slow or lacking?

These are only a few of the more obvious questions. However, they will suffice to show that, in areas where watershed control is of primary importance, we must carefully scrutinize our methods and standards of land management if we are to gain our objective of "the greatest good to the greatest number."

Absorption-Transpiration Quotient of Nursery Stock[1]

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IN PREVIOUS papers (*8, 9, 10*), the writers stressed the importance of the anatomical and physiological makeup of nursery stock grown for reforestation purposes. This paper presents the results of determinations of two characteristics of seedlings related to their general vigor: namely, the relative transpiration capacity of the crown and the total absorbing surface of the root system. It is believed that these properties determine, in a great measure, the water balance of plants, and thus have a direct bearing upon their resistance to drought and frost (*2, 3, 4, 6*). An attempt, therefore, was made to correlate the degree of stock succulence with the ratio of numerical values expressing the root absorbing surface and the relative transpirational loss. This ratio was termed absorption-transpiration quotient.

Analytical Procedure

The loss of water by seedling crowns was determined by means of a transpiration chamber (Fig. 1). This chamber, 34 by 12 by 9 inches, was constructed from plywood and insulating asbestos. At one end of the chamber, a 7-inch electric fan was installed behind an electric heating unit. A removable wire basket for plant specimens was placed on a shelf built on the same level as the elements of the heater. A 220° F. thermometer was inserted in a rubber-lined hole, bored in the roof of the chamber. Eight ventilating openings, 1 inch in diameter, were drilled in both ends of the chamber, and a rotating sheet metal disc, 9 inches in diameter, was mounted on one end. This disc had openings corresponding to those on the chamber, and its rotation facilitated the control of ventilation intensity and the degree of temperature. One side of the chamber was hinged to allow placement of tested tissues.

The seedling crowns were cut from the roots exactly at the ground line with a sharp pruning knife. The fresh weight of the crowns was determined on an accurate diet balance. The weighed crowns were placed in the wire basket and the basket inserted in the chamber, which had been preheated to 180°F. The chamber was closed and the fan-heater unit started. The tissues were exposed to forced transpiration for 10 minutes, during which period the temperature was kept constant. The plants were removed and weighed. The loss of water in grams was calculated per seedling.

The total root surface was determined by a newly devised method involving titration. The roots were washed to remove all soil particles and air dried. Then they were immersed in a solution of 3 N HCl for 15 seconds. After the excess acid was allowed to drain for 5 minutes, the roots were transferred into a beaker containing 250 ml. of distilled water. The contents of the beaker were stirred and allowed to stand for 10 minutes. A 10 ml. aliquot was titrated with *N*/3 NaOH, using phenolphthalein as indicator. The total absorbing capacity of root surface, expressed in ml. of titration, was calculated per seedling, and designated as the "titration value" of the root system.

Results of Investigation

The experimental material included nursery stock which varied greatly in its rate of growth either because of inherent properties or because of differences in soil fertility. The description of the three sets of seedlings of different origin follows.

1. Jack pine seedlings, one year old, raised in greenhouse sand cultures. One portion of these seedlings was raised on Plainfield sand of a low nutrient content, with no application of fertilizers. Another portion was produced on similar sand treated with an unreasonably high application of nitrogen fertilizer (130 pounds of elemental N in the form of ammonium nitrate).

2. Shortleaf pine seedlings, one year old, raised on nursery beds. Some of these seedlings were produced in a fertile loam and showed re-

[1]Contribution from the Soils Department, Wisconsin Agricultural Experiment Station, Madison, in cooperation with the Wisconsin Conservation Department. Publication authorized by the director of the Wisconsin Agricultural Experiment Station. The authors are indebted to W. H. Brener, L. H. Kahler, and C. T. Youngberg for providing experimental stock, and to R. Wittenkamp for assistance in laboratory determinations.

markably rapid growth. Other seedlings were produced on a similar soil whose content of nutrients was reduced by repeated cropping. The long growing season of the nursery region undoubtedly was responsible for particularly luxurient development of seedlings on fertile soil.

3. Norway spruce seedlings, two years old, raised in greenhouse on sandy soil of a fair fertility level. Some of these seedlings originated from seed collected in southwestern Wisconsin; others from seed obtained from central Sweden. The seedlings from Wisconsin seed grew during two years to an average height of 7½ inches; seedlings from Swedish seed at the end of the second growing season attained an average height of only 1¼ inches.

The fresh weight, top-root ratio, transpiration loss of crowns, titration value of roots, and absorption-transpiration (A/T) quotient of the described stock are presented in Table 1.

Discussion of the Results

The analysis of jack pine seedlings provided a clear-cut picture of the effect produced by the unbalanced fertilization and the significance of absorption-transpiration quotient. A high degree of succulence of nitrogen-fertilized stock, characterized by a low A/T quotient, was con-

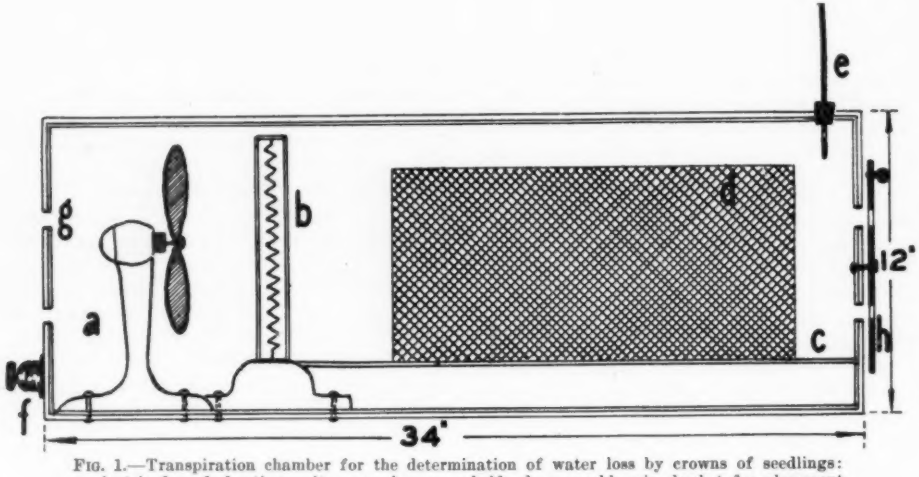

FIG. 1.—Transpiration chamber for the determination of water loss by crowns of seedlings: *a*, electric fan; *b*, heating unit; *c*, mesh screen shelf; *d*, removable wire basket for placement of plant tissue; *e*, thermometer (0-220° F.); *f*, switch; *g*, ventilating opening; *h*, rotating disc.

TABLE 1.—FRESH WEIGHT, TOP-ROOT RATIO, ABSORBING SURFACE OF ROOTS, LOSS OF WATER BY CROWNS, AND ABSORPTION-TRANSPIRATION QUOTIENT OF NURSERY STOCK OF DIFFERENT INHERENT OR ENFORCED RATE OF GROWTH

Nature of stock	Weight of av. seedling *g.*	Top-root ratio	Titration value of av. root system *ml.*	Loss of water by av. crown *g.*	Absorption-transpiration quotient
Jack pine, 1-0, raised on unfertilized soil	0.8	1.52	0.37	0.27	1.48
Jack pine, 1-0, raised on soil treated with excess of nitrogen (400 lbs./A. of NH_4NO_3)	2.8	2.45	0.50	0.91	0.55
Shortleaf pine, 1-0, on loam of a low fertility	5.8	1.30	0.13	1.34	0.10
Shortleaf pine, 1-0, on fertile loam	11.9	2.06	0.10	3.60	0.03
Norway spruce, 2-0, raised on fertile soil from seed collected in central Sweden	0.12	0.73	0.02	0.03	0.66
Norway spruce, 2-0, raised on fertile soil from seed collected in southwestern Wisconsin	1.66	2.91	0.07	0.60	0.12

firmed by chemical analyses, determination of specific gravity, and microscopic study of the tissues by Voigt (*7*). The same fact was previously established by Shirley and Meuli (*6*).

No attempt was made to evaluate the stock of shortleaf pine from the standpoint of its resistance to drought and frost. However, there is a strong probability that shortleaf pine, a species of very modest nutrient requirements, attains on a fertile heavy soil an undesirably luxurient growth. This assumption is in agreement with the unfavorable top-root ratio and the extremely low A/T quotient.

Although the spruce seedlings of Swedish origin did not reach plantable size in two years, they proved to be considerably more resistant to frost than seedlings originated from Wisconsin seed. This was revealed through actual experience in the Griffith State Forest Nursery, Wisconsin, where the seedlings of both kind were raised side by side. The values determined for A/T quotient are in agreement with these observations.

It should be noted that absorption-transpiration quotient varies within a wide range depending upon the species and the mode of stock production.

It has been previously pointed out that the top-root ratio is not a too reliable indicator of stock quality (*1, 5*). This is especially true in regard to spruce, which often develops heavy laterals with very few fibrous rootlets and short roots. The results of this study indicate the need for a more exacting criterion.

Because of the comparative simplicity and rapidity of analytical procedure, the writers express hope that the determination of the absorption-transpiration quotient will receive the attention of nursery managers and reforestation specialists.

Summary

Determinations were made of the total absorbing surface of roots and the relative transpirational loss by the crowns of seedlings raised under different levels of soil fertility and from seed of different origin. The absorbing root surface was determined by treatment of roots with 3*N* HCl and titration with *N*/3 NaOH. The loss of water was established by subjecting seedling crowns to forced aeration at a temperature of 180° F. in a special chamber. The analytical procedures involved are described in detail.

The absorption-transpiration quotient was found to be correlated with the degree of succulence of seedlings or their vulnerability to drought and frost. The comparative simplicity and rapidity of the test is stressed, and the determination of A/T quotient is suggested for the qualitative evaluation of nursery stock raised for reforestation purposes.

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Cruising Intensity and Accuracy of Cruise

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THE NEED of a simple guide for determining the required cruising intensity corresponding to a certain accuracy has been discussed in this JOURNAL by Barton and Stott.[1] These authors have prepared a pictorial chart giving the number of 1/5 acre sample plots needed for attaining different levels of accuracy in stands of different degrees of uniformity and density. Their chart is based on certain numerical values of the coefficient of variation of the volume per sample plot characteristic for various stand conditions. Numerical values of such coefficients have previously been published by Girard and Gevorkiantz.[2] The difficulty which will be encountered in using a chart of the type given by Barton and Stott lies in the problem of correctly identifying the actual stand conditions with any one of the particular categories included in the chart. It must be realized, furthermore, that a number of other factors besides stand uniformity and density greatly affect the variation in volume from one sampling unit to another. Such factors are: volume per acre, size and shape of sampling units, efficiency of cruising design. An efficient cruising design, obtained by subdividing an area into blocks of relatively homogenous stand conditions (stratification) or by laying strips or cruise lines at right angles across the main stand stratification, will lead to considerably smaller coefficients of variation than the application of relatively inefficient designs or methods of cruising. It therefore appears that correct appraisal of the cruising intensity required for a certain degree of accuracy can be made only if the standard error of a cruise in a given forest type and for a given cruising method has actually been determined in a number of cases. An accumulation of data on the numerical values of coefficients of variation so calculated is therefore highly desirable.

In determining the coefficient of variation Girard and Gevorkiantz compare the volumes between 1/4 acre sample plots. Different values would obviously be obtained if 1/5 acre plots or 1 acre plots were chosen for this comparison. By calculating the standard deviation between ultimate sampling units as represented by the volume per plot, considerably higher values are usually obtained than when comparing the volumes of sampling units representing the sum of several ultimate units, such as the combined volumes of the plots lying on one and the same cruise line running across the main stand stratification. Sampling units larger than 1/4 acre or 1/5 acre sample plots should therefore be used for the calculation of sampling error and coefficient of variation. For the sake of generality, and in order to avoid possible misunderstanding, it may be preferable to define the *coefficient of variation as the percentage standard deviation of volume of sampling units of the size of one acre.* The volume per acre X, calculated from the total volume wX of a sampling unit of w acres, may then be considered as an observation of weight w, while the volume per acre based on the measurement of volume on 1 acre represents an observation of weight 1. In accordance with this definition, the volume per acre as determined from a single 1/4 acre plot would represent an observation of weight 1/4. The area of each sampling unit in acres is thus identical with the weight w of the average volume per acre X of a sampling unit, which may be represented by a single strip or by the sum of the plots lying on a cruise line.

The coefficient of variation as defined above is found to vary considerably from one case to another. In cruising rather regular and fully stocked stands of upland oak by strips 1 rod in width run across the main stand stratification, coefficients as small as 10 to 15 percent have been obtained. In a line plot cruise of badly depleted stands of pine in South Carolina, J. Youorski found coefficients of variation as large as 60 percent and over. A value of about 30 percent might be characteristic of average conditions, provided a cruising design of reasonable efficiency is being applied. For a numerical example furnished by Youorski the calcula-

[1] Barton, W. W. and C. B. Stott. Simplified guide to intensity of cruise. Jour. Forestry 44:750-754. 1946.

[2] Girard, J. W. and Suren R. Gevorkiantz. Timber cruising. Forest Service, U. S. Dept. Agric. 160 pp. mimeog. 1939.

tion of the coefficient of variation is shown in detail in Table 1. The same method of calculation is applicable to strip cruises. Provided that the approximate value of the coefficient of variation of a forest cruise is known, the cruising intensity necessary for a certain accuracy may be obtained from Table 2. This table gives the standard error of the estimated volume in percent of volume for different cruising intensities, for different size tracts and for different values of the coefficient of variation. The standard errors corresponding to a coefficient of variation of 15 percent would apply to stands of high uniformity, the value of 30 percent to average conditions of forest cruising, and the value of 60 percent to stands of low uniformity and patchy distribution of volume. Qualifying statements with regard to the correct use and interpretation of Table 2 are given in a footnote to the same table. Some further explanations concerning the calculation of the sampling error of a cruise when dealing with weighted observation follow.

The meaning of the weighted arithmetic average is probably most easily understood. Since the weights w are nothing else than the areas in acres of the various sampling units, the products of wX represent the total volumes of the various sampling units. The sum of the total volumes of all sampling units (ΣwX), divided by the total area of these same sampling units (Σw) gives the weighted arithmetic average, that is, the actual average volume per acre of all the strips or plots measured in a cruise (see Table 1).

An observation X is said to have the weight w if it has the same standard deviation as the arithmetic average of w observations of weight 1. If s is the standard deviation of an observation of weight 1, the standard deviation s_w of an observation of weight w is therefore equal to $s/\sqrt{w}$. This is in accordance with the well known formula for standard error of an arithmetic average. In cruising, an observation of weight 1 has been defined as the volume per acre obtained from the measurement of an area of 1 acre. The standard deviation between the volumes on 1 acre sample plots or on 1 acre strips would therefore give us the standard deviation of an observation of weight 1. The standard deviation of the volumes per acre of plots or strips each covering w acres would be $\sqrt{w}$ times smaller. In comparing the variability of volumes per acre in different types of stands or in different designs of cruising, the standard deviation of an observation of weight 1 as defined above may be expressed in percent of average volume per acre. The resulting value is known as coefficient of variation.

The best estimate of the standard error of an observation of weight 1 is obtained by calculating s by the formula

$$s^2 = \frac{\Sigma w(X - \overline{X})^2}{N - 1}$$

For observations of equal weight ($w_1 = w_2 = \ldots = {}^{n} = 1$) this formula reduces to the ordinary formula for standard deviation. With weighted observations, the deviations $X - \overline{X}$ will, on the average, be $\sqrt{w}$ times smaller than the corresponding deviations of observations of weight 1; consequently, the squared deviations will be w times smaller. In order to obtain a mean square estimate of the standard deviation of an observation of weight 1, the observed squared deviations $(X - \overline{X})^2$ of observations of different weight must therefore be multiplied by their respective weights and only then added and divided by $N - 1$.

The standard error of the weighted arithmetic average is finally obtained by dividing the standard deviation of an observation of weight 1 by the square root of the sum of the weights of all sampling units. This obviously implies that the weight of the arithmetic average is equal to the sum of the weights of the various observations. The standard error of the weighted arithmetic average indicates the accuracy of the cruise. A correction factor for limited population must be applied to this value. This correction factor is equal to the square root of (1 — proportion cruised).[3] It is of practical significance only if the area cruised is larger than 5 or 10 percent of the total area of the tract.

In regard to the calculation of sampling error of a line plot cruise as illustrated in Table 1, the question may be raised if one is justified in combining the plots of each line and merely computing the standard error between the average volume per acre of each line. It may be felt that the standard deviation between plots within cruise lines should be taken into consideration also. As a matter of fact, by computing the average volume per acre from the plots of each line, the variation of volume due to the incomplete coverage of a line is auto-

[3] Schumacher, F. X. and R. A. Chapman. Sampling methods in forestry and range management. Duke Univ. School of Forestry Bul. 7, 213 pp. 1942.

TABLE 1.—CALCULATION OF COEFFICIENT OF VARIATION AND STANDARD ERROR OF VOLUME OF LINE PLOT CRUISE. AREA OF TRACT 54 ACRES. CRUISING INTENSITY 25.2 PERCENT

Line No.	Number of plots on line	Area of plots on line[1] w	Volume per acre X	Volume on plots wX	wX^2
		Acres	*M. bd. ft.*	*M. bd. ft.*	
1	3	0.6	0.4	0.24	0.096
2	8	1.6	1.7	2.72	4.624
3	7	1.4	0.6	0.84	0.504
4	7	1.4	1.0	1.40	1.400
5	15	3.0	1.4	4.20	5.880
6	10	2.0	0.6	1.20	0.720
7	9	1.8	2.4	4.32	10.368
8	5	1.0	0.8	0.80	0.640
9	4	0.8	0.8	0.64	0.512
		13.6		16.36	24.744

$$\overline{X} = \frac{\Sigma wX}{\Sigma w} = \frac{16.36}{13.6} = 1.20$$

($\overline{X}$ = Volume per acre)

$$s^2 = \frac{\Sigma w(X-\overline{X})^2}{N-1} = \frac{1}{N-1}\left[\Sigma wX^2 - \frac{(\Sigma wX)^2}{\Sigma w}\right]$$

(N = Number of sampling units; number of strips or lines)

$$= \frac{1}{9-1}\left[24.744 - \frac{(16.36)^2}{13.6}\right] = 0.633$$

$$s = \sqrt{0.633} = \pm 0.80$$

(s = standard error of observation of weight 1)

$$s(\%) = \frac{s}{\overline{X}} \cdot 100 = \frac{0.80}{1.20} \cdot 100 = 67\%$$

$s(\%)$ = coefficient of variation)

$$s^2_{\overline{x}} = \frac{s^2}{\Sigma w} = \frac{0.633}{13.6} = 0.0465$$

$$_cs^2_{\overline{x}} = 0.0465\left(1 - \frac{13.6}{54.0}\right] = 0.0348$$

$$_cs_{\overline{x}} = \sqrt{0.0348} = \pm 0.19$$

($_cs_{\overline{x}}$ = standard error of arithmetic, corrected for limited population)

Volume per acre = 1.20 ± 0.19 M. bd. ft.

Total volume = 64.8 ± 10.3 M. bd. ft.

[1]When cruising by strips, w is equal to the area of the strip in acres.

matically reflected in the calculated line averages. The combination of ultimate sampling units (plots) assures furthermore that the sampling errors tend to be normally distributed, which is necessary if we wish to interpret correctly the calculated standard error of a cruise. If the lines run across some rather pronounced stand stratification, the errors between plots would turn out to be much larger than the probable discrepancies between the average volume per acre of the combined plots and the actual volume per acre of the entire strip within which the plots are equally spaced. A greatly exaggerated value for the standard error of a cruise would therefore be obtained by computing the standard error between plots.

TABLE 2.—STANDARD ERROR OF ESTIMATED VOLUME FOR DIFFERENT INTENSITIES OF CRUISE, FOR VARIOUS SIZE FORESTS, AND FOR DIFFERENT VALUES OF COEFFICIENT OF VARIATION

Size of tract or forest	Cruising percent					
	1%	2%	5%	10%	20%	30%
	Standard error in percent of volume					
	(i) for coefficient of variation of 15 percent[1]					
50	21.1	14.8	9.2	6.4	4.2	3.2
100	14.9	10.5	6.5	4.5	3.0	2.3
200	10.6	7.4	4.6	3.2	2.1	1.6
500	6.7	4.7	2.9	2.0	1.3	1.0
1,000	4.7	3.3	2.0	1.4	1.0	0.7
2,000	3.3	2.3	1.5	1.0	0.7	0.5
5,000	2.1	1.5	0.9	0.6	0.4	0.3
10,000	1.5	1.0	0.7	0.4	0.3	0.2
	(ii) for coefficient of variation of 30 percent[1]					
50	42.2	29.7	18.5	12.7	8.5	6.5
100	29.9	21.0	13.1	9.0	6.0	4.6
200	21.1	14.9	9.2	6.4	4.2	3.2
500	13.3	9.4	5.8	4.0	2.7	2.0
1,000	9.4	6.6	4.1	2.8	1.9	1.4
2,000	6.7	4.7	2.9	2.0	1.3	1.0
5,000	4.2	3.0	1.8	1.3	0.9	0.6
10,000	3.0	2.1	1.3	0.9	0.6	0.5
	(iii) for coefficient of variation of 60 percent[1]					
50	84.4	59.4	37.0	25.4	17.0	13.0
100	59.8	42.0	26.2	18.0	12.0	9.2
200	42.2	29.7	18.5	12.7	8.5	6.5
500	26.7	18.8	11.7	8.0	5.4	4.0
1,000	18.9	13.3	8.3	5.7	3.8	2.9
2,000	13.3	9.4	5.8	4.0	2.7	2.0
5,000	8.4	5.9	3.7	2.5	1.7	1.3
10,000	6.0	4.2	2.6	1.8	1.2	0.9

[1]Coefficient of variation is here defined as the standard error of observations of volume measured on one acre (observation of weight one) expressed in percent of volume per acre. For stands of high uniformity and normal density this coefficient may be as low as 15 percent, provided an efficient cruising design is applied which will eliminate as much as possible the effect of visible stand stratification. A coefficient of 30 percent corresponds to average conditions of forest cruising. Values of 60 percent are characteristic of irregular stands with a patchy distribution of volume. Estimates of the actual value of the coefficient of variation are best determined from a trial cruise.

The figures of this table are strictly applicable only if the sampling units are selected independently and at random. The accuracy of a systematic cruise is generally higher than that of a random cruise of the same intensity. This may be taken into consideration by using a somewhat smaller multiplier (2 instead of 2½ or 3) when computing the limit of error that corresponds to a given standard error.

Notes

Sudworth's "Forest Trees of the Pacific Slope"

It may not be amiss to mention to foresters that the world's largest publisher, the Government Printing Office, which does not advertise its books, still has for sale this classic early work on the dendrology of the Pacific region by George B. Sudworth. Too commonly, government monographs prepared at considerable expense, both in authors' time and printing costs, are issued in limited editions soon exhausted within a few years. *Forest Trees of the Pacific Slope* (Forest Service, U. S. Dept. Agric., 441 pp., illus., Supt. of Documents, Washington 25, D. C. 1908. $1.50), an almost extravagantly expensive government publication of its day in terms of cost of preparation, apparently was more fortunate in the size of its original edition. As it is natural to assume that a book of that date would now be out of print, many persons who would like to have copies probably have not bothered to order it.

In this modern age of many good to excellent (and a few not so good) regional and state tree books and manuals, it may be appropriate to refer again to this pioneer and forerunner volume. The author, the late George B. Sudworth, Forest Service dendrologist for many years, had a long career in the Department of Agriculture, from 1886 until his death in 1927. *Forest Trees of the Pacific Coast* covered not only California, Oregon, and Washington, but British Columbia and Alaska as well. It was the first of four projected, nontechnical volumes to deal by regions with all the native forest trees of North America north of the Mexican border. The series was never completed. The unfinished second part, on Rocky Mountain trees, appeared in a series of five smaller bulletins (all out of print): *The Cypress and Juniper Trees of the Rocky Mountain Region* (U. S. Dept. Agric. Bul. No. 207, 36 pp., illus. 1915); *The Spruce and Balsam Fir Trees of the Rocky Mountain Region* (U. S. Dept. Agric. Bul. No. 327, 43 pp., illus. 1916); *The Pine Trees of the Rocky Mountain Region* (U. S. Dept. Agric. Bul. 460, 47 pp., illus. 1917); *Miscellaneous Conifers of the Rocky Mountain Region* (U. S. Dept. Agric. Bul. No. 680, 45 pp., illus. 1918); and, posthumously, *Poplars, Principal Tree Willows and Walnuts of the Rocky Mountain Region* (U. S. Dept. Agric. Tech. Bul. 420, 112 pp., illus. 1934).

The first volume contained detailed notes on distinguishing characteristics, range, and occurrence for the 150 tree species known to inhabit the Pacific region. A valuable feature was the inclusion of 207 figures, original drawings by Forest Service artists to illustrate all species described. Nearly all were life size drawings of foliage, fruits, cones, and seeds, for ready identification. These unexcelled drawings, many prepared with great accuracy from photographic prints of living material, have been widely reproduced in other books. Permission for their use is freely granted, so long as credit to the Forest Service is given.

Some changes in both scientific names and common names have occurred during the 40-year period since publication, but these are not serious. About 20 percent of the scientific names have been altered to conform to the present International Rules of Nomenclature and modern usage. These changes include adoption of older specific names and reduction of several species to varieties.

Nevertheless, Sudworth's early volume continues to be a best buy for foresters, students, nature lovers, scouting organizations, etc., at the bargain price of $1.50. Remittances should be made to the Superintendent of Documents, Government Printing Office, Washington 25, D. C. This publication cannot be obtained from the Forest Service nor from the Department of Agriculture.

ELBERT L. LITTLE, JR.,
U. S. Forest Service.

A. C. Neumuller
1882—1949

A. C. (Carl) Neumuller, of Lansford, Pennsylvania, forester for the Lehigh Coal & Navigation Company and its subsidiary the Lehigh Navigation Coal Company, died May 10 after an illness of a month.

Mr. Neumuller was born at Summit Hill, Pa., and educated at East Stroudsburg State Normal School. He taught for several years until

he entered Penn State to study under B. E. Fernow. After a year at Penn State, he transferred to McGill University. He spent two years at McGill working in the summers for the Canadian government. Following Dr. Fernow's advice, his final year was spent studying forestry in Europe, principally in the Black Forest of Germany. It was on his return from Germany in 1913 that he became forester for the firm which was his employer when he died.

Few foresters are privileged to spend their professional lives in one location as did Carl. He was a capable, careful, and conscientious worker. He was gifted with remarkable foresight and over 25 years ago began studies which show that clearcutting is not always as undesirable as it is now said to be. He was strongly of the opinion that it has now, as it always has had, its place among the silvicultural systems and that selective cutting was not the cure-all that it is sometimes painted.

Located in a "hot-spot" he never neglected fire suppression work and the results are clearly visible to anyone who has been familiar with the territory in which he worked. He never lost his interest in the organization and efficiency of the protection forces. In 1917, he was one of the instigators and an organizer of the Anthracite Forest Protective Association.

He was a member of the Executive Committee of the Lehigh Valley Flood Control Council and was active in the work of the Interstate Commission on the Delaware River. He was a Life Member of both the American Forestry Association and the Pennsylvania Forestry Association, and a Junior Member of the Society of American Foresters. A true gentleman, a delightful companion, a marvelous story-teller with a fund of stories which he could use to shed light on any problem and brighten any discussion, Carl will be missed by all who knew him.

ROBERT MOORE.

The Soaking Treatment of Black Cottonwood and Red Alder Fence Posts in Pentachlorophenol

There is available to the farmers of western Oregon a large volume of black cottonwood (*Populus trichocarpa*) and red alder (*Alnus rubra*) which could be used for fence posts and allied purposes. Unfortunately, these species are of the nondurable class with a normal service life in the Willamette valley of 4.8 and 5.2 years, respectively. If these species could be readily treated, at a reasonable cost to the user, their service life then would be extended sufficiently to make them more attractive as a source of material. Especially would this be advantageous to those farmers located in areas deficient in supplies of the more durable species, such as western red cedar, Port Orford white cedar, and incense cedar.

The object of this study was to investigate cold-soaking and hot-soaking preservative treatments of seasoned black cottonwood and red alder in a 5 percent pentachlorophenol-diesel oil solution. These treating methods are easy to use and equipment requirements are inexpensive. Pentachlorophenol was selected as the experimental preservative because it meets the requirements of a good toxic agent and has been favorably received for the treatment of this class of material.

Since there has been little reported work done on the preservative treatment of black cottonwood and red alder, it was considered advisable to study the treatability of these species when employing the treating methods indicated. The treatments were set up to investigate radial penetration and rate of end penetration plus absorption when correlated with the following variables: (1) treating time, (2) treating temperature, (3) incising, and (4) end coating.

Conclusions

1. Round, seasoned red alder and black cottonwood posts can be successfully treated by soaking in an unheated 5 percent pentachlorophenol-diesel oil solution. Such treatment, which relies on end penetration alone, requires that the depth of the treating solution be equal to or greater than the height of treatment desired. When the depth of solution was 22 inches a soaking period of 24 hours was required to obtain a satisfactory penetration to a height of 18 to 22 inches in the samples. Retentions of about 13 pounds per cubic foot of wood were obtained and the sapwood was completely penetrated.

2. Incising the posts doubled the depth of radial penetration in red alder and increased the radial penetration about 10 percent in black cottonwood to give a radial penetration of approximately 0.30 inch for each species at the end of 6 hours soaking. Even more important was the fact that radial penetration was more uni-

form in incised posts of either species thus reducing the chances of thin spots in the protective shell of treated wood.

3. A reduction in retention is posible in incised posts of these species because the uniform radial penetration obtained makes it unnecessary to rely on end penetration. The quantity of preservative retained by incised samples, end-coated with white paint (Fullerglo 520), ranged from 37 to 60 percent of that retained by non-incised, uncoated samples for soaking periods of 4 to 6 hours.

4. In experiments where comparisons could be made, there was no significant difference between hot soaking and cold soaking for either black cottonwood or red alder. Consequently, cold soaking rather than hot soaking is recommended as the more suitable method of treatment.

5. It appears likely that incised, end-coated black cottonwood can be satisfactorily treated by a somewhat shorter soaking period in a cold solution than red alder, possibly 4 hours as compared with 6 hours. For soaking periods of 24 hours or more there is little difference in the treatability of the two species.

6. The protective value of those treatments that appear promising, based on these experiments, should be checked by service tests to determine whether or not the penetrations and retentions are actually adequate.

CHI SHAN CHENG,
Oregon State College.

Microfilm Viewing Table

A homemade viewing table used with a portable microfilm projector has made possible considerable savings in compiling data for flood control surveys. It is easily built of inexpensive material, and should be useful to many workers seeking a convenient, economical way to use microfilm records.

To make the viewer, a pine office table was fitted with a sliding shelf for the projector, a mirror placed at an angle of 45 degrees, and a viewing glass set in the top of the work table (Fig. 1). The hand crank on the projector is within easy reach of the operator for changing the film image. The general scheme of construction shown in Figure 1 gives approximate dimensions; these may be varied within projector limits.

The mirror is enclosed on three sides to eliminate reflections from outside sources. This enclosure is of lightweight plywood, painted black on the inside.

A standard grade of commercial mirror was used. There is a slight ghost image on the projection due to the usual back-surface silvering. This could be eliminated by use of a surface-coated mirror. Since the effect is not objectionable, the added expense of surface coating was not considered worthwhile.

Clear glass (double strength) covered with tracing paper was used for the table-surface

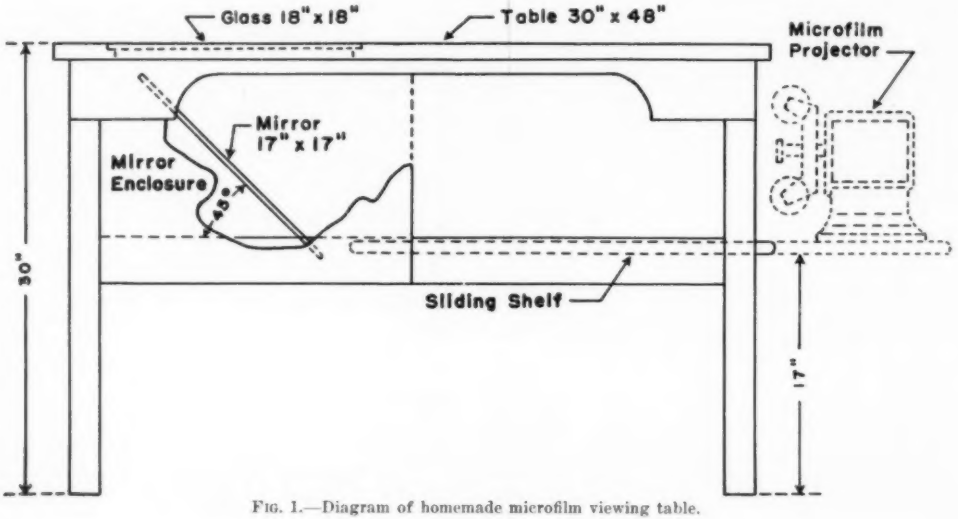

FIG. 1.—Diagram of homemade microfilm viewing table.

viewer. The commercial grade of etched glass was proved unsatisfactory; it caused highlights which made some of the finer pencil figures on data sheets unreadable.

A discarded table was used and the unit constructed in a home workshop at a cash outlay of less than $10 for the mirror and glass. The projector retails at about $150, one-fourth the cost of a commercial viewer.

A possible improvement could be made by placing the projector nearer the floor and using a smaller (surface-coated) mirror to gain projection depth in the vertical distance. This may allow more knee room for the reader and still allow fairly convenient placement for projector operation.

This viewing unit also serves very well for a tracing table using the projector for a light source, and the projector is available when needed to project images on a wall or screen. It can be used to enlarge microfilmed maps to any desired base-map scale, either on the viewer or on a wall for the larger scales.

The advantages of microfilm copying are so well known they need not be discussed. However, it may be of interest that we have been able to gather a permanent record of data from 5,000 original tabulations available only in other cities. The cost has been less than $100. The data have been copied and assembled ready for use in less than two weeks. Hand transcription of records would require several months. Photostat copies would be several times as expensive, and handling and filing of the records would be a problem.

H. J. FITTINGER,
California Forest and Range Experiment Station.

Points of View

Know Your Forest Soils

I desire to offer the following comment on the article "Method of Correlating Soils with Douglas-fir Site Quality" in the November, 1948 issue of the Journal.

As a forester working with farmers in the Lewis County Soil Conservation District, I have been able to check closely the findings of Messrs. Arnst, Hill, and Bond, and to put to test the site-soil correlations. Many times by glancing at a soils map of a farm, I have been able to determine immediately the site index. This not only saves a great deal of time, but, in discussing site and growth with a farmer, makes it easier for him to understand these two principles of forest management.

In conversing with a farmer before going into his woodlot, a forester is in a much better position to discuss management if he knows the site then and there. Much time would otherwise be spent guessing what the site is or laboriously measuring ages and heights of the farmer's trees while he stood idly by wondering what is being done. Also since many farmers have nonstocked or poorly stocked cutovers, or fields unsuitable for cropping, site cannot be determined by the usual method, and knowing the site can be the critical selling point in persuading him to grow a tree crop, or apply management practices. There are always border-line cases also, where good land use could be either timber production or pasture and hay production. By knowing the site for that bare land, and applying a soil rent equation, an estimate can be reached as to which practice will be the most profitable.

Another use for soils information in forestry is in thinning programs. Some soils prohibit thinning to a great degree due to shallowness or clay pan, while others allow very heavy thinnings without danger of blowdown. By knowing the soil profile, a forester can then determine how heavily to thin, other criteria being equal. I have noted that deep medium-textured soils can support heavy thinnings, whereas silty clay loams or clays are very dangerous to deal with, especially in fully stocked stands and young age classes.

Soils information of this kind has greatly speeded up good forestry practices and good land use in Lewis County, and I would be greatly handicapped without it. Any forester would be greatly benefited in my opinion if he familiarized himself with the Soil Conservation Service's soil profiles and their application to forestry in his particular area.

WILLIAM J. SAUERWEIN,
Soil Conservation Service.

Reviews

Elements of Applied Hydrology. By Don Johnstone and William P. Cross. 276 pp. Illus. The Ronald Press Company, N. Y. 1949. $5.

In this book, which is one of a series in civil engineering, the subject of hydrology is approached from the standpoint of practical applications, then treated in a direct and logical manner that should prove helpful not only to engineering students but to others who are interested or working in this field. The authors state, "Our twin objectives have been (1) to set forth some of the fundamentals of the subject, and (2) to encourage an analytical approach to the solution of engineering problems in general."

Phases of the hydrologic cycle are illustrated. Standard methods of collecting and presenting precipitation and runoff data are described, followed by a discussion of the more important relationships between these segments of the hydrologic cycle.

A chapter entitled "The Role of the Land" is devoted to an examination of other conditions and processes that effect the disposition of precipitation during wet and dry weather. Since several of the hydrologic phenomena considered may be influenced by the land and the vegetation upon it, the concepts discussed in this chapter are of particular importance in the application of hydrology to watershed management. The influences of vegetation on interception and evapo-transpiration are discussed. However, other important functions of plant cover are not mentioned in this chapter. To be complete, the discussions of interception and surface runoff should include the important role that vegetation plays both mechanically and organically in maintaining the infiltration capacity and permeability of the soil. These functions in turn reduce surface runoff and erosion.

Further, the effects of erosion as a process involving the action of water upon the surface of the land also warrant consideration in this chapter. The direct relationship between the life of a reservoir and the rate of erosion in the tributary drainage is mentioned in the introduction, but other detrimental effects of erosion of hydrologic importance are omitted. Some examples are (1) bulking of flood flows with eroded material; (2) clogging of flood control channels, water spreading grounds, irrigation ditches, and similar structures; and (3) pollution of water by material carried in suspension. These conditions which stem from the land must be reckoned with in many types of hydrologic problems.

Recognized procedures of hydrologic analyses, their applications and their limitations are well explained and illustrated in succeeding chapters. These include (1) unit graphs; (2) flood routing; (3) infiltration analysis; (4) developing hydrographs from basin characteristics; and (5) applications of statistical methods. These chapters should be of particular value to those who may not be familiar with the techniques or tools that are available to aid in the solution of hydrologic problems.

Although a short bibliography is included at the end of each chapter in the book, additional references of broader scope would be helpful.

The authors deserve commendation for the preparation of this volume in which the elements and relationships of a complex subject are presented in understandable terms. This book should have wide use as a text for students and as a guide for others interested in hydrology.

J. D. Sinclair.

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Sixty Below. By Tony Onraet. 192 pp. Illus. Didier, New York. 1948. $3.

Although this book does not bear a direct relationship to forestry, most foresters will be interested in it since it deals with a man's personal experiences in the Northland. It is thus related to outdoor activities and events which all foresters find engrossing.

The book contains an introduction by Dr. Thomas Wood who made a tour of the Northwest Territories with Lord Tweedsmuir, governor-general of Canada, in 1937. At that time he met Onraet, recognized the interest contained in his life and experiences in that region, and persuaded him to prepare the material from which this book was developed.

The pages of this volume portray a vivid picture of life in the far north—its problems, its hardships, and its associations.

C. Frank Brockman.

Stone Mulching in the Garden. By J. I. Rodale. 164 pp. Rodale Press, Emmaus, Pa. 1949. $3.

The value of stone in relation to agriculture may have been prejudiced somewhat by literal acceptance of the New Testament reference to Christ's parable concerning the seed that fell upon stony places—seed which, because it found no deepness of earth, was scorched by the sun and withered away.

Yet there is ample evidence in antiquity for use of stone mulches. Columella, Palladius, Pliny, Theophrastus, and others are witnesses to the practice of stone mulching, and Virgil's book on agriculture contains an article on grape culture which almost parallels Mr. Rodale's suggestions for development of various plants and trees under the stone mulch system.

This book does not recommend broad or indiscriminate application of rock mulches to the farms, but deals with rock mulching in the garden and small fruit orchard. Within its pages, however, appear several chapters by friends and disciples of the author, whose success with his technique has been so pronounced as to suggest wide extension of the system. One of these contributors, Herbert Clarence White, presents the most convincing and entertainingly scientific discussions in the whole collection. His experiences are illustrated with excellent photographs of lemons three inches in diameter, each yielding as much juice by actual and proved measurement, as five to seven specimens of market size, and oranges up to four and a half inches in diameter, yielding seven and a half ounces of high grade juice.

Stone mulching, it appears, is most successful when combined with the use of leaf mulch, the latter to be laid around the plant prior to placement of the stones, and renewed as soil is formed, by lifting off the stones and administering more leaves. The result is rapid decomposition of the leaf mulch, abundance of earthworms in the compost, and extraordinary development of mineral values beneficial to rapid and healthy growth of the plants. It seems to be well established also that stone mulches aid in better than normal development of the mycorrhizal mechanism. Other features are retention of moisture underneath the stones, protection of underlying soil against baking, and a certain amount of beneficial decomposition along the under side of the stones themselves.

The value of stone mulches has not been overlooked by foresters, either in the growth of small plants or of trees. Walter C. Lowdermilk has written of Chinese pebble mulching (*National Geographic*, June 1945). Walter Muelenberg, in *The Flower Grower*, July 1944, tells of an unusual experience with *Tsuga canadensis*. And Dr. William H. Eyster gives us some illuminating information on hedgerows, within whose borders fruit trees may be grown comparatively free from pests and diseases under what appears to be a condition of natural rock mulching.

Stone mulching, like other organic practices, occurs in nature. Shrubs and trees which grow among rocks are often remarkably healthy and productive.

JAMES R. SIMMONS.

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Seed Storage with Particular Reference to the Storage of Seed of Indian Forest Plants. By T. V. Dent. Indian Forest Records (new series) Silviculture, 7 (1):1-134. Dehra Dun, India. 1947. Rs 3/141—or 6 sh. 3d.

This publication on seed storage is essentially the second part of a seed manual for Indian forest plants. The first[1] published 11 years earlier covered the basic information on seed size, weight, quality, and germinability of over 400 species of forest plants.

Seed storage was originally written in 1942, but had to be set aside because of the war. The manuscript was finally completed late in 1946. It consists of two major parts. The first, of 58 pages, is written in textbook fashion. It provides a general and theoretical background for Part II. There are concisely written chapters on the importance of tree seed storage, seed germination, seed dormancy, duration of seed viability, collection, and extraction of tree seed, methods of storage, protection of stored seed from pests, transportation of seed, and seed testing. Most of these subjects are made clear by examples drawn from experience with Indian tree species.

A summary of available seed storage data for Indian forest plants is included in the 63 pages of Part II. It is based partly upon material published in Troup's "Silviculture of Indian Trees," in various provincial publications, and

[1]Sen Cupta, J. N. Seed weights plant percents, etc., for forest plants in India. Indian Forest Record (N.S.) Silviculture 2(5):175-221. 1936.

in some foreign sources, and partly upon unpublished records of the Indian Forest Research Institute at Dehra Dun. The author has done a commendable job of assembling this diverse material into a form which permits ready comparison.

The main body of information is condensed into two tables. One is a summary table which shows the number of species in 50 families which have short-lived and long-lived seed. The definite seed storage characteristics shown for some families could be helpful to the practictioner using unfamiliar species. Nevertheless, it would be well to remember that even different species within a genus may vary considerably in seed storage characteristics. The second table contains the meat of the paper. It includes available information on seed storage of 237 forest plants, all but 28 native to India. It is presented by species, arranged in alphabetical order by scientific names. Shown are the source of information, locality of seed collection, method of storage (gunny sack, sealed tin, or stoppered bottle), age of seed sample when tested, number of tests, germinative capacity, and miscellaneous notes and recommendations. A notable omission is reference to storage temperatures. Presumably there was no control of temperature and no data available on those actually experienced.

Of course, the information contained in *Seed Storage* is most useful to foresters in India and neighboring countries. But it should also be helpful to foresters in other tropical and semi-tropical lands, since they deal with many of the same or closely related species. Even foresters in temperate lands can find some useful information. Although not many species grown in the United States are included, there are representatives of 31 genera which include species useful for conservation planting in this country.

Out of this summary of information, the author has developed some suggestions for future research. In broad terms these include coordination and standardization of methods; prompt publication of results along standardized lines; the establishment of a modern, fully equipped seed-testing laboratory; comprehensive tests on selected tree species of particular importance in reforestation; and special investigations on several specific problems. While we, in the United States, appear to be more advanced than our colleagues in India in the use of presowing treatments for dormancy and the use of cold storage and controlled temperatures in storing seeds, the general pattern of proposed research is one we also could well follow.

On the whole, *Seed Storage* is a useful publication. Its author recognizes that fresh seed should be used wherever possible in artificial reforestation, but that for many species and conditions seed must be stored. He realizes that it is important, therefore, that storage methods be developed and used which preserve the utmost viability. Aside from some typographical errors the publication has few flaws. Those responsible for forest seed storage and research work in this country could read this paper with profit.

PAUL O. RUDOLF,
Lake States Forest Experiment Station.

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Stocking Northern Great Plains Sheep Range for Sustained High Production. By E. J. Woolfolk. 40 pp. Illus. U. S. Dept. of Agric., Washington, D. C. 1949.

This study has application to sheep production in one of the major range areas in the West. As the author states, range is important because the economic and social pattern of the region is conditioned by the use of native forage plants. A small portion of the area is cultivated and much of it is marginal for crop production, because of the recurrence of drought. While not the dominant phase of the industry, feeder lambs, wool, and replacement ewes are important products of the range livestock industry in the area.

The report is significant in many respects. It is a study of sheep grazing in an area where little range investigational work has been done on sheep husbandry. It was carried on during a period of maximum change in climatic conditions, from severe drought to high annual precipitation. It deals with the reaction of two major species of range grasses, blue grama grass and bluestem wheat grass, to climate and grazing use. It evaluates the influence of many biological and physical factors on the practical management of a major range type. The principal objectives of the study are improvement and maintenance of a range type which is characterized by past overuse and subject to periodic drought and stabilization of the range sheep.

industry without excessive supplementary feeding or liquidation of breeding stock.

The experiment was conducted over a period of six years, from 1936 to 1941, at Fort Keogh near Miles City, Montana. Yearling ewes were stocked at three intensities of grazing (light, conservative, and heavy). Due to rapid changes in forage production after the drought years of 1934 and 1936, the number of animals per pasture varied but the intensities of use were held to the three standards. Many biological and physical factors bearing on the problem are considered. Botanical composition, periodicity of plant growth, herbage production, and utilization were evaluated. It gives particular attention to grazing habits and general activity of sheep under fence. The influence of wind, temperature, and predators is analyzed and related to the problem of better range use.

The effects of the three levels of use on plant, animal, and soil serve as the major criteria for evaluation of proper levels of stocking the range. The preponderance of evidence is in favor of the conservative level of use. While neither density nor maximum herbage yield was obtained by conservative use, the best quality of herbage was obtained without a significant sacrifice of cover density or yield. Animal weights under conservative use were greater than under heavy use but not as high as for animals on the lightly used pasture. The conservatively grazed pasture showed the best balance between forage utilization and animal weight.

The data obtained should be of interest to grassland ecologists as well as range managers. The response in densitiy change was greater due to climatic conditions than to intensity of grazing. Plants with seed stalks were more numerous in the pastures receiving the heavier intensities of grazing. Stubble heights did not vary significantly with intensity of grazing, but the number of grazed plants increased with the intensity of grazing. Grazing of sheep under fence without herders led to repeated use of previously grazed plants as new growth appeared, in preference to ungrazed plants. Shading-up of sheep appeared to be more nearly related to insect activity than to temperature. Fences, if in pastures of the size employed in the study, may lead to unequal distribution of use as they encourage concentration adjacent to the fences.

In setting up standards of proper stocking of mixed prairie (short grass) range in the Northern Great Plains, the investigation introduces standards of use which are more conservative than have been used elsewhere for somewhat the same type vegetation. This may be due to need for both improvement and maintenance of the range. On the whole, the study shows good organization and consideration for all the essential factors. These data obtained are directly applicable to the rationalization of suitable standards for conservation management of rangeland.

MELVIN S. MORRIS,
Montana State University.

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Erfarenheter vid acklimatisering av en nordamerikansk massavedstall i Europa (*Experience in acclimatization of a North American pulpwood pine in Europe*). By Greve. A. Fr. v. d. Schulenburg. Svenska Skogsvårdsföreningens Tidskrift 46 (6): 382-392. Stockholm. 1948.

Lodgepole pine has been planted in Finland and northeastern Germany to a very limited extent. The present report deals with the results of plantations made by the elder Tigerstedt at Mustila in Finland from 1910 to 1934. Seed from the highlands of British Columbia and northwestern United States has given the best results. The coast form has produced short and crooked plants. Lodgepole pine planted on fine sand or loam with abundant moisture has produced after 33 years double the volume of Norway spruce and a 50 percent higher yield than scotch pine planted on the same site. On dry sites or gravel soils growth was inferior. Emphasis is laid on the relatively high water requirements of lodgepole pine, and its capacity to "drain" moist sites. Furthermore, this pine appears more resistant to insects and diseases that beset native species on heavy soils.

Forty years is proposed as the best rotation for pulpwood production, considerably less than for native pine and spruce. So far, more extensive introduction of this species in Scandinavia and Finland seems to be limited by difficulty of securing seed of certified origin. Seed collected locally from planted trees that have made the best development will soon be available.

HENRY I. BALDWIN.

The Forest Range in Southern Agriculture. Mimeo. Southern Forest Experiment Station, New Orleans, La. 1949.

This publication contains the following six papers presented in a symposium at the annual meeting of the Association of Southern Agricultural Workers in Baton Rouge, January 31—February 2, 1949.

"The Scope of Southern Forest Range Work," Robert S. Campbell.

"Utilizing Forage on Longleaf Pine Forest Ranges," John T. Cassady.

"Pastures and Feed Crops to Round Out Forest Grazing," H. W. Bennett.

"Fire Protection in Southern Pine Lands by the Use of Wide Improving Pasture Strips," L. T. Nieland.

"A Study of Species, Seeding Methods, and Fertilizing Practices for Use on Piney Woods Regions," Glen W. Burton and A. C. Mathews.

"Wildlife: Its Relation to Forestry and Grazing," Byrant A. Bateman.

Forest range grazing is a substantial item in the rural economy of much of the South. The region has some 15 million cattle, two million sheep and goats, and 10 million hogs. The bulk of these animals graze on forest ranges at sometime during the year. The income from the animals that consume forest range forage is of real importance to the two million farm families in the region. This region, which comprises 187 million acres and extends from Virginia to East Texas and Oklahoma, is also a great timber-producing area and far exceeds the revenue of livestock production.

In addition, timber production and watershed protection in this general region are so important that they must be given first priority in any biological or conservation program. However, it is apparent that grazing is in the piney woods to stay; therefore, its rightful place must be recognized.

The piney woods region is composed primarily of the following four broad types: upland hardwoods, bottomland hardwoods, shortleaf-lobolly pine-hardwoods, and longleaf-slash pine. The number of acres required to graze a cow for six months in these types varies greatly—from three to fifteen acres in the relatively open grassy meadows or usable swamps of the bottomland hardwoods, to twenty to sixty acres in the dense woods and poor soils of the upland hardwoods. The longleaf pine forest ranges of the longleaf-slash pine type are by far the most important from the standpoint of grazing, and much of the grazing information discussed at the symposium and in this paper is built around this type.

The southern forest region is more adapted to cattle grazing and production than other breeds of livestock. Cattle are primarily grass eaters and turn to hardwoods only when grass is scarce or unpalatable. They do not damage pine reproduction unless forced to graze areas that are severely overutilized. Eighty to ninety percent of the forage in the longleaf pine forest is composed of grasses which are classed under the two subtypes wiregrass and bluestem. The blue grasses alone make up approximately 50 percent of the ground cover and over one-half of the forage. In general, the grasses are often deficient in phosphorus and crude protein. Grass and other forms of forage are especially abundant in many large areas of the longleaf pine forest which have been severely cut over.

Sheep and goats are not well adapted to the general piney region, but are well suited to certain localized areas. The grazing of hogs is definitely discouraged throughout the entire region and especially so in the longleaf pine forests. They eat the pine masts, root up young seedlings, and eat the bark of longleaf pine seedlings of all sizes up to large saplings. Among the wildlife species, deer, turkey, and bob white quail are important and must be considered in a livestock grazing program.

To maintain a desirable grazing relationship in the piney woods, a program of combined timber growing, watershed protection, and wildlife development should provide the basis for the utilization and conservation of all untilled lands in the region.

VERNON A. YOUNG,
Texas Agricultural and Mechanical College.

Development of a Blister Rust Control Policy for the National Forests in the Inland Empire. By Donald Matthews and S. Blair Hutchison, U. S. Dept. Agric., Forest Service. 116 pp. Illus. Missoula, Mont. 1948.

This report presents the findings of a two-year study conducted under the auspices of the Northern Rocky Mountain Forest and Range Experiment Station and the Northern Region

of the U. S. Forest Service. It is divided into five major sections. The first describes the present blister rust situation. The next two deal with the national and regional importance of western white pine. The fourth section presents a discussion of factors to consider in future planning, and the last presents a proposed policy.

After twenty years of blister rust control work in the Inland Empire, we are given for the first time in this publication the results of a detailed study to determine whether or not this work has been, still is, and may continue to be physically, economically, and socially justified. The authors conclude that the effort is justified, provided it is recognized that blister rust control is but one phase of a thoroughly coordinated management program. They emphasize directing future planning toward the "white pine project" and not just the "blister rust control project."

Professional foresters and representatives of industry should be especially interested in this report. It is well written, easy to read and understand, interesting, and generously illustrated. The tables and charts tell the story and the text interprets it. The discussion is logically presented, leading directly from the analysis of the problems to the proposed solution. It is also well summarized.

The authors have not only drawn extensively on available literature (56 references cited), but have based their deductions largely on collected and previously reported statistics. This statistical or quantitative approach makes the study appear more conclusive than perhaps even the authors intended. As an example, the final calculations demonstrating the economic feasibility of growing western white pine are predicated on their assumption that the stumpage differential for white pine over associated species will be $7.50. Even though this assumption may be conservative, estimates of future conditions are matters of individual judgment and thus no single set can be final. This shows up again in forecasting the effectiveness of various levels of blister rust control in white pine stands of different ages. Variances of viewpoint will result primarily because of different appraisals of these and other unknowns. These make for the major limitations of the report. In all fairness, however, it should be said that the authors resort to assumptions only when research has not yet provided factual data. For the most part their position is well taken, unbiased, and is based on the best possible trend analyses.

More than the authors' thinking on white pine management in national forests of the Inland Empire is presented. There is developed also a technique in resource appraisal which correlates the interplay of many physical, economic, and social factors. Their technique could well be applied under many different circumstances in other parts of the United States. For example the economic feasibility of growing white pine is dependent upon many varying economic conditions as well as stand characteristics, site quality, and blister rust intensity. By studying separately the problems in 594 working units, comprising 5 to 10 thousand acres each, they were able to classify the problem for the whole white pine type. Action programs will be materially enhanced because this technique was used in the study.

The report answers the question: "Can western white pine be grown at reasonable cost under the handicap of blister rust?" Sufficient bases are provided for establishing broad objectives and policies, but more research is necessary positively to answer the question. It depends not only upon the comparison of future costs, including blister rust control, and future market values, but upon our conservation philosophy. However, using reasonable inferences, good personal judgment, the best statistics, and trend predictions, the authors' calculations are enlightening.

They present five alternative management programs ranging in costs from one to eight million dollars annually for the first five years. These would include a range of from 10 to 50 percent of the white pine type. After analysis they concluded that the 4 million dollar program "buys about as much white pine in the first six twenty-year periods as the 6 and 8 million-dollar programs." The advantage of the larger programs would come after the first rotation, and because more of the white pine type and lands in private ownership would be included. The 4 million-dollar program would bring 1,237,000 acres, or about ⅓ of the white pine type, under intensive management having an annual sustained yield capacity of 298 million board feet. Under such a program an expenditure of 51 million dollars or $3.07 per M during the first rotation would produce added stumpage values of 127 million dollars. This return is about 2½ times the cost, or an income of about one percent on the money

expended. These calculations are predicated on funds being immediately available, and the assurance of continuous financial support; also that blister rust control work would be concentrated on working units having a high percentage of national forest land.

Factors on which more information is needed more completely to answer all questions regarding white pine management include: (1) how accurately to appraise and forecast blister rust damage in stands of various ages, (2) how to evaluate other entomological and pathological losses, (3) costs of growing white pine, (4) how to predict future yields more accurately, (5) future demand for western white pine particularly the speciality uses, (6) the actual market response to higher white pine prices, (7) possibilities for substitution, (8) the effect of forest and other industrial developments, such as a pulp and paper industry in the Inland Empire, (9) how the problem of mixed ownership is to be handled, (10) future population size and distribution, and (11) national prosperity.

ERNEST WOHLETZ,
T. S. BUCHANAN,
University of Idaho.

South Carolina Raw Materials. By H. E. Shiver, B. F. Buie, and Inman F. Eldredge. 219 pp. Illus. University of South Carolina Press. Columbia. 1949. $3.

This volume is the fourth in a series presented by the University of South Carolina Press dealing with the special problems and opportunities of the State of South Carolina.

The book is divided into three sections. The first is concerned with the diverse problems of cotton and its products. The second deals with the industrial minerals and rocks of the state. The third section presents the problems and opportunities of the forests and forest industries of the state.

Foresters, particularly those interested in South Carolina forest problems, will find the section dealing with forests and forest industries especially interesting. "Cap" Eldredge is as effective as a writer as he is as an after dinner speaker and story teller.

The development of the forest industries, and simultaneously the forest problems, from the colonial period to the present time is interestingly told and provides background for a thorough analysis of the present situation and for recommendations for future policies. The Forest Survey data are generously used, but so skillfully employed that the usual dryness attached to statistics has been avoided.

Alarming decreases in the state's pine sawtimber volume resulted from heavy war-time operations. This in itself need not cause pessimism because growth can be increased sufficiently to wipe out this deficit and supply sufficient increment to support additional forest industries in the state. It is estimated that the elimination of one-half of the waste caused by forest fires, insect diseases, storm, etc. would provide sufficient material to "supply two fair-sized pulp mills." The elimination of some of the waste due to logging and manufacturing would add materially to the supply of wood on which to base additional forest industries in South Carolina.

Those interested in the state's planting problem will be interested in the estimate of "1,500,000 acres of presently wholly or partially unstocked forest land and eroded abandoned fields available and begging for reforestation by planting." At present planting rates, this may require forty years to complete. Many informed people will doubt that South Carolina can afford to wait so long to complete this work.

It is effectively explained that the forest land of the state supports only a small portion of an adequate stand, and therefore is producing only a small percentage of the growth of which it is capable. This understocked condition is due largely to fire and lack of forest management. Under adequate protection and intensive management, it might be possible to triple the state's current annual growth of wood volume.

In the face of a current deficit of quality raw materials, the state can increase its forest industries, provided adequate fire control and good forest management are attained, and provided that some of the current wood waste and some of the available hardwood species not now used are utilized.

Foresters and others interested in South Carolina will find this an interesting and informative presentation.

F. C. GRAGG,
International Paper Company.

Dynamics of Vegetation. By Frederic E. Clements (Compiled and edited by B. W. Allred and Edith S. Clements). 296 pp. Illus. H. W. Wilson Co., N. Y. 1949. $3.75.

This book is a posthumous collection of a choice set of publications bearing upon dynamic ecology. The original sources, dated 1928 to 1940, were issued during the period of some of Dr. Clements' most valuable writing. Most of the chapters are transcriptions of articles published in various reports of the Carnegie Institution of Washington, *Journal of Ecology* (British), *Ecology* (American), and *Scientific Monthly.*

The longest chapter treats of plant indicators and is taken from *Plant Succession and Indicators,* 1928, which is still available from H. W. Wilson Company. From that book, Mr. Allred has retained the most vital parts for quotation and slightly rearranged some of the sections.

The wording of the book is nearly always exact quotation of the original publications. This is to Allred's credit because it is probable that he may have differed with the distribution of emphasis and he certainly must have been tempted to clarify or improve some parts. The deletions were usually historical reviews, or definitely dated statements (such as recommendations for government action), or discussions of related literature, at which Clements was so adept.

Careful researchers will regret that the documentation has been rigidly abridged, for it was considered that when necessary the investigator could refer to the original source. After the table of contents there is a short list of Clements' principal works.

Much of the credit for the 70 plates goes to Dr. Edith S. Clements who constantly helped her husband with photography of scenes he selected. The pictures for one chapter were taken by Dr. J. E. Weaver.

The Latin names have been brought up to date, for the most part, although there were a few disputed forms such as *Achilleia, Agropyrum, Castilleia,* etc. that Clements felt he had to retain. Some disagreement came in due to changes in taxonomy during the period covered by the papers, *e.g. Pseudotsuga mucronata* in one chapter and *P. taxifolia* later.

The glossary is an extremely valuable contribution. This list of definitions of Clementsian terms will help answer a severe criticism that has been heard too often. Not since 1905 had Clements formally defined terms in a glossary (*Research Methods in Ecology*). The definitions are usually in Clements' language although some are from Dr. Shelford or others; there seems to be some influence from Dr. Carpenter's (1938) glossary. The list gives good coverage of the terms used in this group of fundamental writings and therefore includes most of Clements' terms. The definitions are short and clear, and this part of the book is perhaps its most original contribution. There is a full index in addition to the glossary.

Readers will think of other terms they would like to find. *Closed community* is defined but not *community.* This was probably an oversight because in the definition of *plant association* there is a cross reference to *community. Biota, hydrarch,* and *xerarch* are not included. Probably *organism* should have been defined, in order to specify Clements' usages.

The selection of articles for the book and the logical order in which they are presented make for a very effective volume. It forms a concise and coherent treatment of Dr. Clements' fundamental ecological precepts. Although brief, the book gives a complete outline of his ideas on succession, indicators, and the characteristics of the climax. There is much stimulation to be derived from study of the ingenious research methods used with competition, interpretation of indicators, and the relict method. Throughout the book much is woven in that helps in practical interpretation of our environment. This approach is basic to designing correct solutions for human problems in environmental control and conservation of our renewable resources.

It would have been fortunate if Clements could have assimilated the animals of the community more fully. Clements and Shelford's *Bio-ecology* (1939) seems not to have had the influence its importance justified. There has always been difficulty in determining when animal effects are natural or normal. Often animal activities have been considered as complicating disturbances which interrupt the course of succession. This causes trouble in the concepts of disclimax, biological barriers to migration, and dominance. As our knowledge of animal ecology becomes more complete it should not be necessary to regard natural animal activities as special cases. Certainly an ecologically effective animal should be included in the name of a community.

Publication of this selection of Dr. Clements' key writings is a major service to a large group

of ecologists who are interested in his thinking. Few of us are able to obtain and keep track of reprints covering this very important set of classics. Within this book there is balance of fundamental theory, research methods, and applications of ecology to resource management.

PAUL C. LEMON,
N. Y. State College for Teachers.

Current Literature

Compiled by MARTHA MEELIG, *Librarian*
The New York State College of Forestry

Range Management Section Compiled by
FRANCES FLICK, *Library, U. S. Department of Agriculture*

General

The Coming Age of Wood. By Egon Glesinger. 280 pp. Simon & Schuster, Inc., New York. 1949. $3.50.

High Jungle. By William Beebe. 379 pp. Illus. Duell, Sloan & Pearce, New York, 1949. $4.50.

Native Trees of Canada, rev. Dominion Forest Serv. 300 pp. Illus. King's Printer, Ottawa. 1949. $1.50.

Photography for Forestry Purposes. By E. L. Howlett and P. D. Carman. 5 pp. National Research Council of Canada, Ottawa. 1949. No. 1907. 10 cents.

Conservation

An Action Program for the Redwood Forests Proposed by Dewey Anderson With a Statement by E. H. Clapp. 32 pp. The Public Affairs Institute, 312 Pennsylvania Ave., S. E., Washington 25, D. C. 1949.

State-Wide Conservation Lake Construction Program. 124 pp. Illus. Maps. Ill. Dept. of Cons., Springfield. 1947.

Forest Economics

Business Organization for Effective Use of Forest Products. By W. A. Hosmer. Pp. 581-596. Reprint from Harvard Business Review Sept., 1948.

Forest Management

Connecticut Volume Tables for Plantation-Grown Red Pine, Pinus resinosa, Solander. By A. R. Olson, H. W. Hicock and H. A. McKusick. 24 pp. Conn. Agric. Expt. Sta., New Haven. 1949. Bul. No. 529.

The Seelyscope. By G. A. Spear. 7 pp. Illus. Dominion Forest Serv., Ottawa. 1949. Forest Air Survey Leaflet No. 4.

Systemizacja Siedliskowa Wedlug Idei Kompleksowych Typow Lasu. (The Systemization of Localities According to the Idea of Compositional Forest Types.) Summary in English. By B. Witold-Alexandrowicz. 83 pp. Illus. Instytut Badawczy Lesnictwa Warszawa. 1948. Rozprawy i Sprawozdacia. Ser. A. No. 53.

Woodlot Improvement; Managing the Woodlot. By J. A. Cope and F. E. Winch, Jr. 23 pp. Illus. New York State College of Agric., Ithaca. 1948. Cornell 4-H Club Bul. No. 43 rev.

Woodlots for Profit, Comfort, Protection. 28 pp. Illus. The Royal Bank of Canada, Montreal. 1949.

Forest Resources

Forest Resources, Regions and Trees of New South Wales—in Brief. 16 pp. Map. New South Wales Forestry Comm., Sydney. 1947.

Forest Statistics for Hancock County, Maine. 29 pp. Northeastern Forest Expt. Sta., Upper Darby, Pa. 1949. Forest Survey Release No. 4.

Forest Statistics for Northern New Hampshire. 36 pp. Northeastern Forest Expt. Sta., Upper Darby, Pa. 1949. Forest Survey Release No. 3.

Forest Statistics for Southern New Hampshire. 36 pp. Northeastern Forest Expt. Sta., Upper Darby, Pa. 1949. Forest Survey Release No. 5.

The Forests of Present-Day Finland; A Description Based on the National Forest Surveys. By Yrjö Ilvessalo. 56 pp. Illus. Instituti Forestalis Fenniae. 1949.

South Carolina's Forest Resources, 1947. By J. F. McCormack and J. W. Cruikshank. 122 pp. Southeastern Forest Expt. Sta., Asheville, N. C. 1949. Forest Survey Release No. 28.

Logging and Milling

18 Men and a Horse. By D. H. Clark. 217 pp. Illus. The Metropolitan Press, Seattle, Wash.

1949. Ltd. ed., inquire of J. H. Bloedel, 1411 4th Ave., Seattle.

Harvesting Timber Crops. By A. E. Wackerman. 437 pp. Illus. McGraw-Hill Book Co., New York 18. 1949. $5.

Lumber Values for East Texas Pine Logs. By G. R. Gregory and H. L. Person. 31 pp. Southern Forest Expt. Sta., New Orleans. 1949. Occas. Paper No. 113.

Pathology

Moldy Rot of Tapping Panels of Hevea Rubbertrees. By W. J. Martin. 23 pp. Illus. U. S. Dept. of Agric., Washington 25, D. C. 1949. Cir. No. 798. 10 cents (Govt. Print. Off.)

Range Management

Commercial Family-Operated Cattle Ranches, 1930-1947. By H. R. Hochmuth and W. D. Goodsell. 29 pp. U. S. Bureau of Agric. Econ., Washington 25, D. C. F. M. No. 71. 1948.

Getting Better Records of Vegetation Changes with the Line Interception Method. By A. L. Hormay. Jour. of Range Mgt., Baltimore 2, Md. Vol. 2, pp. 67-69. April, 1949.

Grass—a Tool in Soil Conservation. By A. D. Stoesz and H. J. Helm. Journ. of Soil and Water Conservation, Baltimore 11, Md. Vol. 3, pp. 155-158, 188. Illus. October, 1948.

The Grasses of North Carolina. By H. L. Blomquist. 276 pp. Illus. Duke Univ. Press, Durham, N. C., 1948. $7.50.

Machinery for Seedbed Preparation and Seeding on Southwestern Ranges. By D. Anderson and A. R. Swanson. Journ. of Range Mgt., Baltimore 2, Md. Vol. 2, pp. 64-66. Illus. April, 1949.

Methods of Determining Utilization of Range Forage. By H. F. Heady. Same, pp. 53-63.

On Some Grasses, Chiefly of the Edwards Plateau of Texas. By V. L. Cory. Field and Laboratory, Dallas, Tex. Vol. 17, pp. 41-52. April, 1949.

A Proposed Reclassification of Range Forage Types. By R. R. Humphrey. Jour. of Range Mgt. Baltimore 2, Md. Vol. 2, pp. 70-82. Illus. April, 1949.

Spraying 2, 4-D by Airplane on Sand Sagebrush and Other Plants of the Southern Great Plains. By E. H. McIlvain and D. A. Savage. Same, pp. 43-52, Illus.

The Vegetation and Flora of the Region of the Río de Bavispe in Northeastern Sonora, Mexico. By S. S. White. Lloydia, Cincinnati, Ohio. Vol. 11, pp. 229- 302. Illus. December, 1948.

Silviculture and Silvics

The Behavior and Control of Understory Hardwoods in Loblolly Pine Stands. By L. E. Chaiken. 27 pp. Illus. Southeastern Forest Expt. Sta., Asheville, N. C. 1949. Mimeog.

Dating Prehistoric Ruins by Tree-Rings. By W. S. Stallings, Jr., 18 pp. Illus. The Tree-Ring Society [and] The Laboratory of Tree-Ring Research, Univ. of Arizona. 1949. 25 cents.

Soil Conservation

El Bosque y la Conservacion del Suelo; Su Importancia Cultural y Economica. By H. O. Wagner and Hans Lenz. 169 pp. Illus. Editorial Culture, T. G., S. A. Mexico, D. F. 1948.

Soils

Our Land and Its Care. 64 pp. Illus. American Plant Food Council, Inc., 910 17th St., N. W., Washington 6, D. C. 1948.

Wood Preservation

Non-Pressure Treatments of Round Northern White Cedar Timbers with Creosote. By E. E. King. 62 pp. Illus. Univ. of Illinois Engin. Expt. Sta., Urbana. 1948. Bul. Series No. 379. 20 cents.

Wood Technology and Utilization

Identification of Softwoods by Their Microscopic Structure. By E. W. J. Phillips. 55 pp. Illus. Great Britain. Dept. of Scientific and Indus. Res., London. 1948. Forest Products Research Bul. No. 22. 1s. 3d. (H. M. Sta. Off.)

The Natural Durability of Timber. By D. N. Smith. 17 pp. Illus. Great Britain Dept. of Scientific and Indus. Res., London. 1949. Sixpence (H. M. Sta. Off.)

Selling Black Walnut Timber, rev. By W. D. Brush. 19 pp. Illus. U. S. Dept. of Agric., Washington 25, D. C. 1949. Farmer's Bul. No. 1459. 10 cents (Govt. Print. Off.)

Survey of Wood Planing and Turning Machinery in Vermont. 11 pp. Tables. The Vermont Bureau of Industrial Research, Norwich Univ., Northfield, Vt. 1949.

The Use of Timber in Mining. By H. Henshaw. 84 pp. Illus. Timber Development Assoc., Ltd., London, E. C. 4. 1949.

Society Affairs

Officers and Members of the Council—1948-1949

CLYDE S. MARTIN, *President*
Weyerhaeuser Timber Company,
P. O. Box 1645,
Tacoma 1, Wash.

WILLIS M. BAKER,
Forestry Relations Division,
Tennessee Valley Authority,
Norris, Tenn.

PAUL M. DUNN,
School of Forestry,
Oregon State College,
Corvallis, Oreg.

JAMES C. EVENDEN,
Bureau of Entomology and Plant Quarantine,
U. S. Department of Agriculture,
Coeur d'Alene, Idaho.

CHARLES F. EVANS, *Vice-President*
U. S. Forest Service,
Glenn Building,
Atlanta 3, Ga.

CHARLES H. FLORY,
State Commission of Forestry,
Calhoun State Office Building,
Columbia, S. C.

WILLIAM B. GREELEY,
West Coast Lumbermen's Association,
4444 White-Henry-Stuart Building,
Seattle 1 ,Wash.

CLARENCE S. HERR,
Woods Department,
Brown Company,
Berlin, N. H.

HENRY CLEPPER, *Executive Secretary*
825 Mills Building,
17th Street at Pennsylvania Avenue, N. W.
Washington 6, D. C.

RICHARD E. MCARDLE,
Forest Service,
U. S. Department of Agriculture,
Washington 25, D. C.

DEWITT NELSON,
Division of Forestry,
Department of Natural Resources,
Sacramento 14, Calif.

JOHN W. SPENCER,
U. S. Forest Service,
Post Office Building,
Denver 2, Colo.

Nominations Invited for President and Council in S.A.F. Election

All members are again reminded that the regular biennial election will be held next December 10. A president, vice president, and nine other members of the Council will be elected for the two-year term 1950-1951.

Any or all of the present Council may be renominated, provided they accept the nomination in writing. However, President Martin has announced that he will not be a candidate for reelection.

Membership on the Council is restricted by the Constitution to Members (formerly Senior Members) and Fellows. Any Member or Fellow is eligible to hold office who is in good standing and who accepts the nomination in writing and declares his willingness to serve if elected.

Each voter will have an opportunity to ballot on all candidates for office. Candidates for the office of president are voted on separately; the candidate who receives the highest vote is declared elected president, and the candidate who receives the next highest vote is declared elected vice president.

The nine remaining Council members are elected in accordance with the system of proportional representation. The procedure of proportional representation will be explained in a later issue of the JOURNAL. It is the system by which the Society has been electing Council members for the past decade.

How Nominations Are Made

The Constitution (Article VIII, Section 2) states the conditions under which nominations are made by petition.

1. Each petition shall name but one candidate.
2. All candidates must be eligible to hold elective office.
3. A petition shall bear the signatures of at least ten voting members who at the time of signing the petition are eligible to vote in the coming election. (Eligible voting members are Junior Members, Members, and Fellows in good standing.)
4. A voting member may not sign more than one nominating petition for member of the Council.
5. Petitions must be submitted by October 15.

The Society has no special form for submitting nominating petitions. They may be written as follows:

We, the undersigned voting members of the Society of American Foresters, hereby nominate John Doe, a Member (or Fellow), for the office of president (or member of the Council) for the two-year term 1950-1951.

All nominating petitions should be sent promptly to the Society's executive office. The names of all candidates will be announced monthly in the JOURNAL as petitions are received.

There must be at least two candidates for the office of president, and at least nine candidates for membership on the Council.

For President

Charles F. Evans, U. S. Forest Service, Atlanta, Ga. (Southeastern Section.)

For the Council

LeRoy D. Arnold, Indian Service, U. S. Department of Interior, Washington 25, D. C. (Washington Section.)

Lloyd P. Blackwell, Louisiana Polytechnic Institute, Ruston, La. (Gulf States Section.)

F. H. Brundage, Harbor Plywood Company, Portland, Ore. (Columbia River Section.)

D. B. Demeritt, Dead River Lumber Company, Bangor, Maine. (New England Section.)

Stanley G. Fontanna, Department of Conservation, Lansing, Mich. (Central States Section.)

Ralph W. Hayes, Louisiana State University, Baton Rouge, La. (Gulf States Section.)

Frank H. Kaufert, School of Forestry, University of Minnesota, St. Paul, Minn. (Upper Mississippi Valley Section.)

E. W. Littlefield, Division of Lands and Forests, New York Conservation Department, Albany, N. Y. (New York Section.)

Gordon D. Marckworth, College of Foresty, University of Washington, Seattle, Wash. (Puget Sound Section.)

Richard E. McArdle, U. S. Forest Service, Washington, D. C. (Washington Section.)

Stuart Moir, Western Forestry and Conservation Association, Portland, Ore. (Columbia River Section.)

DeWitt Nelson, Department of Natural Resources, Sacramento 14, Calif. (Northern California Section.)

Earl Porter, International Paper Company, Mobile, Ala. (Southeastern Section.)

Russell Watson, Manistique, Mich. (Wisconsin-Upper Michigan Section.)

The Coming Election of Fellows. How Fellow Nominations Are Made

All Members (formerly Senior Members) and Fellows of the Society are hereby advised that nominations for the grade of Fellow are now open. The election of Fellows will be held at the time of the Society's regular biennial election next December 10.

As defined by the Constitution (Article III, Section 6), "Fellows shall be foresters of outstanding achievement as leaders in responsible directive or distinctive individual work of a fruitful character. They shall be elected from the Members and shall be engaged in forestry work at the time of their election."

Significance of the Grade

The highest distinction that can be conferred on a member by the Society, this grade is awarded in recognition of outstanding achievement. Fellows do not pay increased dues; their dues are the same as those of Members.

Since the Society was founded in 1900, there have been 66 Fellows elected. At the present time the number of living Fellows is 50. Since the last election in December 1947, four Fellows have died: John C. Gifford of Florida; William G. Howard of New York; Aldo Leopold of Wisconsin; G. A. Pearson of Arizona; and Hugo Winkenwerder of Washington.

Nominations Are Made by Petition

The procedure for placing Members in nomination for the grade of Fellow is by petition. The Society has no printed form for this purpose. The petition may be typewritten thus:

We, the undersigned Members and Fellows of the Society of American Foresters, hereby nominate——— to the grade of Fellow for the regular election of 1949.

Remember these simple rules:

1. A petition may not name more than one candidate.

2. It must be signed by 25 Members or Fellows in good standing.

3. It should be accompanied by a factual, not eulogistic, biographical sketch of at least 200 words giving an account of his professional career and accomplishments.

4. It must be received in the executive office of the Society in Washington, D. C., not later than October 15.

The executive employees of the Society cannot be responsible for obtaining signatures on partially completed petitions or on petitions incom-

plete by reason of unacceptable signatures (that is, signatures of other than Members and Fellows in good standing).

Nominations Received

Up to the time of going to press with this issue, the following nominations had been received.

Evan W. Kelley, Montana.
E. I. Kotok, District of Columbia.
Lee Muck, District of Columbia.
Dana Parkinson, District of Columbia.

Election Procedure

Fellows are not elected by the membership at large, but by a board of electors which consist of all present Fellows and the present Council. (A Council member who is also a Fellow has but one vote.)

A form of preferential voting is prescribed by the Constitution and Bylaws by which the electors indicate first, second, and third choices. The system is described in Bylaw 21. To win election a candidate must receive an affirmative vote of not less than one-half the total eligible votes cast.

List of Fellows

The current roster of Fellows follows. The state in which each Fellow is domiciled and the year of his election are shown after his name.

Allen, Shirley W. Michigan. 1948.
Baker, Hugh P. Massachusetts. 1948.
Bates, Carlos G. Minnesota. 1940.
Besley, Fred W. Maryland. 1940.
Butler, Ovid. Maryland. 1940.
Carter, E. E. District of Columbia. 1942.
Chapman, H. H. Connecticut. 1922.
Cheyney, E. G. Florida. 1944.
Clapp, Earl H. Maryland. 1930.
Coffman, John D. District of Columbia. 1946.
Dana, Samuel T. Michigan. 1935.
Eldredge, I. F. Louisiana. 1942.
Fischer, Arthur F. California. 1940.
Frothingham, Earl H. California. 1942.
Gill, Tom. District of Columbia. 1948.
Girard, James W. Oregon. 1944.
Granger, C. M. District of Columbia. 1946.
Graves, Henry S. Connecticut. 1918.
Greeley, William B. Washington. 1918.
Guthrie, J. D. Virginia. 1942.
Hall, William L. Arkansas. 1940.
Hawes, Austin F. Connecticut. 1939.
Hawley, Ralph C. Connecticut. 1942.
Holmes, J. S. North Carolina. 1939.
Hosmer, Ralph S. New York. 1932.
Illick, J. S. New York. 1946.
Jeffers, D. S. Idaho. 1948.
Kinney, J. P. District of Columbia. 1942.
Koch, Elers. Montana. 1940.
Korstian, Clarence F. North Carolina. 1942.
Lowdermilk, Walter C. California. 1948.
MacDonald, G. B. Iowa. 1944.
Marsh, R. E. District of Columbia. 1948.
Martin, Clyde S. Washington. 1948.
Mason, D. T. Oregon. 1948.
Mulford, Walter. California. 1939.
Munger, T. T. Oregon. 1946.
Peavy, G. W. Oregon. 1939.
Peck, Allen S. Colorado. 1946.
Preston, John F. Maryland. 1948.
Schmitz, Henry. Minnesota. 1940.
Show, S. B. District of Columbia. 1948.
Siecke, E. O. Texas. 1946.
Sparhawk, W. N. New Hampshire. 1946.
Spring, Samuel N. New York. 1939.
Watts, Lyle F. District of Columbia. 1946.
Winslow, C. P. District of Columbia. 1942.
Wirt, George H. Pennsylvania. 1948.
Zon, Raphael. Minnesota. 1918.

Preliminary Program and Information About the National Meeting of the Society of American Foresters

The 1949 national meeting of the Society of American Foresters will be held in Seattle, Wash., October 11-14. The headquarters will be the Olympic Hotel.

Descriptions of all scheduled activities follow. Members of the Society are welcome to invite guests to all functions except the Society Affairs session on the afternoon of Tuesday, October 11. Ladies are specially invited to attend the annual dinner on Wednesday evening, October 12.

No functions have been scheduled for Tuesday evening, October 11, which is held open for forestry school alumni meetings and other informal gatherings. However, the Committee on Local Arrangements cannot be responsible for arranging alumni functions, and the committee should not be asked to perform this service. Those wishing to schedule alumni dinners or meetings should deal direct with local hotels or restaurants. Numerous facilities for such functions are available in Seattle.

Committees for the Meeting

Two committees are in charge of the program and arrangements for this meeting.

The chairman of the Program Committee is Gordon D. Marckworth, College of Forestry, University of Washington, Seattle 5. The other members are Horace J. Andrews, William D. Hagenstein, C. R. Patrie, and L. T. Webster.

The chairman of the Committee on Local Arrangements is K. M. Murdock, Pacific Northwest Loggers Association, 4465 Stuart Building, Seattle 1, Wash. Other members are Charles S. Cowan, E. F. Heacox, J. K. Pearce, and H. L. Plumb.

Many Local Attractions

Within easy motoring distance from Seattle are many attractions for foresters, whatever their special interests. Recreational areas are to be found in the mountains, on the seashore, and in Puget Sound. For those interested in logging there are highlead, skidder, cat, truck, rail, gyppo, and other types of logging operations. Utilization specialists may see large and small sawmills, plywood plants, sash and door factories, laminating plants, pulp and paper mills, shingle mills, and other wood using industries. And there are farm forests, tree farms, cooperative sustained-yield operations, experiment stations, Indian forests, national and state forests and parks, and public and private tree nurseries.

The operators, owners, and managers of these diversified forests and industries will be glad to have Society members as visitors either before or after the scheduled sessions.

Organized field trips have been planned for Monday, October 10, and Friday, October 14. In addition, members attending the dedication of the Gifford Pinchot National Forest on Saturday morning, October 15, will enjoy a drive from Seattle of unusual scenic charm.

Special Bargain Trips in Yellowstone

Special bargain trips in Yellowstone National Park at one-third the usual cost have been arranged for Society members and friends by E. K. Kremer, Northern Pacific Railway agent in Washington, D. C. May and October are among the park's most colorful months. Although park hotels close because travel declines after schools open in September, the park itself does not close. Never are colors so vivid, hot springs and geysers more spectacular, and wildlife, especially big game animals, more numerous than in October.

Through arrangements with the Northern Pacific Railway, members and guests may take advantage of the Yellowstone side-trip leaving westbound from Chicago on October 6 or 7, and eastbound from Seattle on October 13.

Westbound, Yellowstone is only one of the features offered. Parties may visit the well-known Yakima Tree Farm near Ellensburg, Wash., where the administrators in charge will observe "open house" for those attending the meeting. Visitors may see timber stands and forest management activities typical of the tree farm system of the Cascade Mountains.

This tour has been sponsored by the Society and so planned that eastern foresters may obtain the utmost in enjoyment from their western trip. For details, members are urged to consult the Northern Pacific Railway's advertisement elsewhere in this issue. Special attention will be given parties desiring to travel together for companionship.

Preconvention Activities

Monday, October 10

1. Meetings of the Council; morning and evening.

2. Joint meeting of the Council and Section Officers; afternoon.

3. Field trip to Seattle forest products industries. An all-day tour will be made of representative Seattle plants manufacturing forest products. It will include visits to gang and band sawmills, plywood plants, shingle mills, wood preservation plants, and other diversified wood industries. The trip will be made by private automobiles or busses.

4. Field trip to Everett (Wash.) pulp industry. An all-day trip has been arranged for those interested in pulp products. At Everett, 30 miles north of Seattle, sulfite and soda mills will be in operation. Large and small hydraulic barkers will be demonstrated. The trip will be made by private automobiles or buses.

First General Session

Tuesday Morning, October 11

William D. Hagenstein, *Chairman*

Theme: Forestry in the Pacific Northwest.

1. Greetings and Welcome. Clyde S. Martin, president of the Society.

2. "Background of the Region." William B. Greeley, chairman of the Board of Trustees,

American Forest Products Industries, Inc., Seattle, Wash.

3. "Harvesting the Mature Crop."

By Federal Agencies. Dahl Kirkpatrick, Division of Timber Management, U. S. Forest Service, Portland, Ore.

By Private Operators. Edwin F. Heacox, managing forester, Weyerhaeuser Timber Company, Tacoma, Wash.

Discussion.

4. "Airplane Seeding." Clarence W. Richen, chief forester, Crown-Zellerbach Corporation, Portland, Ore.

Discussion.

5. "Rehabilitation of the Tillamook Burn." John B. Woods, Jr., Oregon State Board of Forestry, Salem, Ore.

Discussion.

Society Affairs Session

Tuesday Afternoon, October 11

Clyde S. Martin, *Chairman*

1. Report of the President. Clyde S. Martin.

2. Report of the Executive Secretary and Managing Editor of JOURNAL OF FORESTRY. Henry Clepper.

3. Reports of Society Committees.

4. "Increasing Society Revenue Through Advertising in the JOURNAL." Lloyd Thorpe, advertising representative for the JOURNAL OF FORESTRY, Seattle, Wash.

5. "Shall Membership Qualifications be Amended to Admit to the Junior Grade Graduates in Wild Land Management Fields Other Than Forestry?" A Panel Discussion.

6. Open forum discussion of Society Affairs.

Division of Silviculture

Wednesday Morning, October 12

Philip C. Wakeley, *Division Chairman*

1. "Harvest Cuttings in the Southern Piedmont Region." D. J. Weddell, dean, School of Forestry, University of Georgia, Athens, Ga.

2. "Hardwoods versus Loblolly Pines." Kenneth B. Pomeroy, Southeastern Forest Experiment Station, Franklin, Va.; and N. T. Barron, Camp Manufacturing Company, Franklin, Va.

3. "Beetles Kill Four Billion Feet of Engelmann Spruce in Colorado." Arthur L. Nelson, assistant regional forester, U. S. Forest Service, Denver, Colo.

4. "Computation of Normal Growing Stock for Ponderosa Pine." Bert R. Lexen, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo.

5. "Sampling Methods in Tree Measurement Sales of National Forest Timber in the Northern Rockies." Donald W. Lynch, Northern Rocky Mountain Forest and Range Experiment Station, Spokane, Wash.

6. "A Look at Selective Cutting in Douglas-fir." Thornton T. Munger, Portland, Ore.; former director, Pacific Northwest Forest and Range Experiment Station.

7. "Recent Developments in Silvicultural Practices in the Douglas-fir Region." Leo A. Isaac, Pacific Northwest Forest and Range Experiment Station, Portland, Ore.

8. "Wood Quality in Relation to Site Quality of Second-growth Douglas-fir." Benson H. Paul, Forest Products Laboratory, Madison, Wis.

9. "The Work of the Forest-Soils Committee for the Douglas-fir Region." T. B. Plair, regional forester, Soil Conservation Service, Portland, Ore.

10. "Correlation between Certain Soil Characteristics and Site for Douglas-fir." Stanley Gessel, College of Forestry, University of Washington, Seattle, Wash.

11. "The Necessity for a Preplanting Soil Survey." Richard Tarrant, Pacific Northwest Forest and Range Experiment Station, Portland, Ore.

Wednesday Afternoon, October 12

F. S. Baker, *Chairman*

Symposum: "Examination of Ponderosa Pine Silviculture."

1. "Reproduction of Ponderosa Pine." George Meagher, Southwestern Forest and Range Experiment Station, Tucson, Ariz.

2. "Growth of Ponderosa Pine." Philip A. Briegleb, Pacific Northwest Forest and Range Experiment Station, Portland, Ore.

3. "Insect Problems in Ponderosa Pine." F. Paul Keen, U. S. Bureau of Entomology and Plant Quarantine, Berkeley, Calif.

4. "Financial Problems of Ponderosa Pine Silviculture." Thomas J. Orr, Jr., Weyerhaeuser Timber Company, Klamath Falls, Ore.

5. Discussions, led by the speakers.

6. Committee reports and business session.

Division of Range Management

Wednesday Morning, October 12

Lincoln Ellison, *Division Chairman*

Symposium: "Analysis of Grazing Capacity on National Forest Range Lands."

1. "Grazing Capacity Estimates and Range Conditions—1949 Concepts." Earl D. Sandvig, U. S. Forest Service, Denver, Colo.

2. "Sustained Grazing Capacity on Northern Rocky Mountain National Forests." Thomas Lommasson, U. S. Forest Service, Missoula, Mont.

3. "Photo Guides as Aids in Determining Range Capacity, Condition, and Utilization." Waldo E. Wood, U. S. Forest Service, San Francisco, Calif.

4. "Judging Range Condition and Trend in a Range Inventory Project in Oregon." George W. Kansky, U. S. Forest Service, Twisp, Wash.

5. "How Grazing Capacity of Mountain Range Lands is Affected by Range Condition and Usability." T. Dean Phinney, U. S. Forest Service, Ogden, Utah.

6. Business Meeting.

Wednesday Afternoon, October 12

7. "Grazing Use of Forest Lands in Interior British Columbia." E. W. Tisdale, University of Idaho, Moscow, Idaho.

8. "Immediate Effects of Logging on Forage Production." George Garrison and R. S. Rummell, Pacific Northwest Forest and Range Experiment Station, Portland, Ore.

9. "Factors Affecting the Grazing Use of Ponderosa Pine Ranges." Joseph F. Arnold, Southwestern Forest and Range Experiment Station, Tucson, Ariz.

10. "Some Aspects of Forage Yield Measurement." Charles E. Poulton, Oregon State College, Corvallis, Ore.

11. "Influence of Precipitation on Yield and Culm Production of Certain Southwestern Montana Range Grasses." Grant A. Harris, Northern Rocky Mountain Forest and Range Experiment Station, Missoula, Mont.

12. "Some Effects of Grazing Intensity on Growth of Northern Great Plains Forage Grasses." Merton J. Reed and Roald A. Peterson, Northern Rocky Mountain Forest and Range Experiment Station, Missoula, Mont.

Division of Private Forestry

Wednesday Morning, October 12

George L. Drake, *Division Chairman*

Joint meeting of Divisions of Economics and Private Forestry.

1. "Effect of Tax Regulations on Long Term Forestry Program."

2. Preliminary Report of Joint Committee on Forest Taxation. Ralph W. Marquis, chairman, U. S. Forest Service, Washington, D. C.

Discussion by Committee Members: Lloyd P. Blackwell, W. D. Hagenstein, E. G. Wiesehuegel, and E. T. F. Wohlenberg.

3. "Ownership Pattern and Its Effect on Forestry." Emanuel Fritz, School of Forestry, University of California, Berkeley, Calif.

Discussion.

4. "What Economic Studies and Surveys are Needed for Development of a Sound National Program of Insect and Disease Control?" S. A. Rohwer, assistant chief, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Washington, D. C.

Discussion. F. P. Keen, moderator, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Berkeley, Calif., Henry J. Vaux, Lee M. Hutchins, and J. J. deGryse.

Joint luncheon, Divisions of Private Forestry and Economics, Chamber of Commerce Building.

Wednesday Afternoon, October 12

Theme: "Growing Young Forests."

1. "Problems Confronting the Industrial Forester in the Management of Young Forests." George L. Drake, Simpson Logging Company, Shelton, Wash.

2. Discussion.

3. Business Session.

Division of Forest Economics

Wednesday Morning, October 12

Joint meeting of Divisions of Economics and Private Forestry. (See program of Division of Private Forestry.)

Wednesday Afternoon, October 12

Ernest Wohletz, *Division Chairman*

1. "Some Criteria for Judging Public Forestry Projects." S. Blair Hutchison, forest economist, Northern Rocky Mountain Forest and Range Experiment Station, Missoula, Mont.

Comments: Henry Vaux, School of Forestry, University of California, Berkeley, Calif.

2. "Determining Forest Land Ownership and Its Relation to Timber Management." Lee M. James, Southern Forest Experiment Station, New Orleans, La.

3. Progress report of Committee on Scope and Method of Research in the Economics of Forestry. William A. Duerr, Southern Forest Experiment Station, New Orleans, La.

4. Business Session.

Division of Forest Products

Wednesday Morning, October 12

H. B. McKean, *Division Chairman*
L. N. Ericksen, *Program Chairman*

1. "Developments in Prelogging and Relogging, and their Relation to Management and Utilization Practices." Clarence W. Richen, chief forester, Crown-Zellerbach Corporation, Portland, Ore.

2. "Utilization of Low Grade Lumber of Douglas-fir." Phimister B. Proctor, technical director, Oregon Forest Products Laboratory, Oregon State College, Corvallis, Ore.

3. "Progress in the Manufacture of Pulp, Chemical, and Board Products from Mill and Logging Waste." Harvey D. Erickson, College of Forestry, University of Washington, Seattle, Wash.

4. "The Use of Impregnated Overlays and Hardwood Veneer Faces on Softwood Plywood Cores." John Ritchie, Douglas Fir Plywood Association, Tacoma, Wash.

5. "Developments and Trends in Forest Products Research." Frank H. Kaufert, chief, School of Forestry, University of Minnesota, St. Paul, Minn.

Wednesday Afternoon, October 12

Field trip to Puget Sound Navy Yard, Bremerton, Wash.

There will be a guided tour of the Navy Yard's boat shop where foresters may see the latest laminating techniques in the fabrication of keels, stems, and all structural parts in small boat construction. This shop, one of the most modern and completely equipped wood fabrication plants in the country, has the largest hot press ever built (40 feet long), dry kilns, treating retorts, and all types of wood working equipment.

This field trip, which will be taken by ferry boat, promises great scenic attractions as well as technical interest.

Division of Public Relations

Wednesday Morning, October 12

S. L. Frost, *Division Chairman*
J. C. Kuhns, *Division Vice Chairman*

1. "Applying National Advertising Principles to Forest Fire Prevention." Ervin F. Grant; Foote, Cone, and Belding, Los Angeles, Calif.

2. "Oregon's Keep Green Program." Arthur W. Priaulx, public relations director, West Coast Lumbermen's Association, Portland, Ore.

3. Forum: "How Can We Get More Tolerance in Forestry Public Relations?" Discussion leader, J. C. Kuhns, assistant regional forester, U. S. Forest Service, Portland, Ore.

4. "The Place of the Public Relations Division in the Work of the Society." Albert Arnst, Weyerhaeuser Timber Company, Tacoma, Wash.

Discussion.

Division of Forest Recreation

Wednesday Morning, October 12

J. V. K. Wagar, *Division Chairman*

1. "Coordination of Multiple Recreation Administration on Forest Lands." C. Frank Brockman, College of Forestry, University of Washington, Seattle, Wash.

2. "Recreation Problems Inherited from the C.C.C. in the Pacific Northwest." Fred W. Cleator, Parks and Recreation Commission, Olympia, Wash.

3. "Recent Experiments in Administering and Charging for Camping, Picnicking, and Summer Home Privileges on the National Forests."

4. "Can the Public Be Taught Nondestructive Nature Appreciation?" H. L. Bill, Mount Rainier National Park, Longmire, Wash.

Wednesday Afternoon, October 12

5. Business Session.

6. "The Objectives, Procedures, and Status of the National Recreation Policies Committee." Shirley W. Allen, School of Forestry and Conservation, University of Michigan, Ann Arbor, Mich.

7. "Federal Aid to Private Owners of Forest Recreation Lands Used by the Public."

8. "The Defense of Forest Recreation Areas Against Overambitious Irrigation, Flood Control, and Water Power Projects."

9. "The Administration and Protection of Forest Recreation Areas Subject to Overuse." E. P. Meinecke, San Francisco, Calif.; formerly with the U. S. Bureau of Plant Industry.

Division of Forest-Wildlife Management

Wednesday Afternoon, October 12

William H. Marshall, *Division Chairman*
Paul D. Dalke, *Program Chairman*

1. "Forest Wildlife Management in the Rocky Mountain Region." Ralph R. Hill, U. S. Forest Service, Denver, Colo.
2. "Fisheries Management in Relation to Forest Management." Paul R. Needham, professor of zoology, University of California, Berkeley, Calif.
3. "Deer and Cattle Range Relationships." Odell Julander and Les Robinette, range conservationists, Intermountain Forest and Range Experiment Station, Ogden, Utah.

The Annual Society Dinner

Wednesday Evening, October 12

Toastmaster: Charles S. Cowan

Address: Hon. Arthur B. Langlie, Governor of Washington.

Entertainment.

Second General Session

Thursday Morning, October 13

George L. Drake, *Chairman*

Theme: Forestry in the Pacific Northwest.

1. "Forest Fire Control (1949)." P. A. Thompson, Regional forester, U. S. Forest Service, San Francisco, Calif.

Discussion.

2. "Management of the Cedar River Watershed (Source of the City of Seattle's Water Supply)." Allen E. Thompson, forester, Seattle Water Department, Seattle, Wash.

Discussion.

3. "Forest Management under the Cooperative Sustained-Yield Program." Gordon D. Marckworth, dean, College of Forestry, University of Washington, Seattle, Wash.

Discussion.

4. "New Developments in the Forest Products Industries." Frank H. Kaufert, chief, School of Forestry, University of Minnesota, St. Paul, Minn.

Discussion.

5. "Promoting Forest Products."

Discussion.

Field Trips

Friday, October 14

1. White River field trip.

This all-day tour (150 miles round trip) will be made by chartered busses. The principal points of interest are the White River Tree Farm and the Snoqualmie National Forest. The tour will proceed via Enumclaw through reforested lands cut over years ago, and up White River to West Fork where typical Douglas-fir truck and railroad logging operations may be seen. There will be demonstrations of high climbing, felling, yarding, and transferring whole truck loads to railroad cars. Visits will be made to improvement cuttings, seed blocks, and areas of natural reproduction. A stop will be made at a camp ground in a setting of old Douglas-fir 200 feet high with one tree ten feet in diameter. With favorable weather, this will be a scenic trip of unusual attractions including close views of Mount Rainier. Field clothes are desirable though ordinary clothing will be adequate. Raincoats or overcoats, and either rubbers or heavy shoes, are suggested.

2. Cedar River field trip.

This all-day tour is scheduled to permit visiting foresters to observe the management of a large municipal forestry operation—the Seattle watershed on the headwaters of Cedar River. The watershed comprises 90,000 acres largely owned by the city, though 24,000 are in the Snoqualmie National Forest and 3,000 acres are in private ownership. Under management for twenty-five years, the watershed contains examples of artificial and natural regeneration, and large truck-logging operations. Commercial logging on all classes of ownership is so integrated that the annual cut does not exceed the sustained-yield capacity. The round-trip distance on this tour is 80 miles. Field clothes are desirable but not necessary. Raincoats or overcoats, and either rubbers or heavy shoes, are suggested. Chartered busses will be used.

Dedication of the Gifford Pinchot National Forest

Saturday Morning, October 15

On Saturday morning, October 15, Society members will participate in the dedication of the Gifford Pinchot National Forest in the State of Washington (formerly the Columbia National Forest) the name of which was officially changed by Presidential proclamation on June 15. This will be an important historical occasion, and members are urged to attend as Mr. Pinchot was the founder and first president of the Society.

The dedication ceremonies will be held at 11 a.m. at La Wis Wis forest camp, near Packwood

on State Highway 5, south of Mount Rainier, Washington. Those who are expected to take part in the ceremonies are Lyle F. Watts, chief of the Forest Service, and Horace J. Andrews, regional forester at Portland, Ore.; Governor Arthur B. Langlie of Washington; Cornelia Bryce Pinchot of Washington, D. C.; and Clyde S. Martin, president of the Society.

Hotel Accommodations

For this meeting the Olympic Hotel will be the headquarters hotel where the general sessions, the Society dinner, and most of the Division meetings will be held. But the Olympic will not be able to accommodate all members. Accordingly, rooms at other suitable nearby hotels have been reserved for those who plan to attend.

In order to assure that Society members and their guests may obtain satisfactory hotel rooms, a special Housing Committee will make the room assignments. The chairman is C. S. Cowan, Washington Forest Fire Association, 949 Henry Building, Seattle 1, Wash. All requests for hotel rooms should be made through Mr. Cowan, who will then notify each applicant well in advance of arrival as to the name and address of the hotel to which he has been assigned. A printed card has been provided for the convenience of members in making room reservations. However, the card need not be used if, when writing to Mr. Cowan, all information requested is sent him.

Those who expect to attend the meeting are urged to cooperate by requesting their room reservations promptly, preferably before September 15. The Society will assume no responsibility for lack of accommodations for those who bypass the Housing Committee and attempt to make reservations direct with hotels.

Because double rooms will be easier to obtain than single rooms, and because double rooms are cheaper per person than singles, members are urged to team up when possible.

Members should remember that the first general session does not start until Tuesday morning, October 11. Two field trips have been scheduled for Monday, October 10, for those arriving early, but no open meetings will be held that day. All are advised to consult the program before making reservations.

List of Hotels

The following Seattle hotels are available for this meeting. All rates quoted are for rooms with bath.

Olympic Hotel, 4th and Senaca Streets (the headquarters hotel). Single, $4.50 and up; double, $7.50 and up; twin-beds, $7.50 and up; suites, $12 and up.

Benjamin Franklin Hotel, 5th and Virginia Streets (10-minute walk from the Olympic). Single, $4 and up; double, $6 and up; twin beds, $7 and up; suites, $16 and up.

Gowman Hotel, 2nd and Stewart Streets (2-minute walk from the Olympic). Double, $6; twin beds, $7 and $8.

Hungerford Hotel, 1100 Fourth Avenue (2-minute walk from the Olympic). Single, $3.50; double, $4.50 and up; twin beds, $6 and up.

Mayflower Hotel, 4th and Olive Streets (5-minute walk from the Olympic). Single, $3.50 and up; double, $5 and up; twin beds, $6.50 and up; suites (2 persons), $12.

New Washington Hotel, 2nd and Stewart Streets (10-minute walk from the Olympic). Single, $4 and up; double, $6 and up; twin beds, $7 and up; single suite, $8; double suite, $10.

Roosevelt Hotel, 7th and Pine Streets (6-minute walk from the Olympic). Single, $4; double, $6; twin beds, $7.

Vance Hotel, 620 Stewart Street (10-minute walk from the Olympic). Single, $3.50 and up; double, $4.50 and up; twin beds, $5.50 and up.

Earl Hotel, 315 Senaca Street (½ block from the Olympic). Single, $3; double, $4; twin beds, $5.

Report of Council Meeting and Actions Taken

A meeting of the Council was held on June 22, 23, and 24, 1949, at the State Game Lodge in Custer State Park near Hermosa, South Dakota.

Nine officers and members were present: Clyde S. Martin, president, Charles F. Evans, vice president; Paul M. Dunn, James C. Evenden, Charles H. Flory, William B. Greeley, C. S. Herr, John W. Spencer, and Henry Clepper, executive secretary. This group constituted a quorum for the conduct of Society business. Because of pressure of official work, Willis M. Baker, Richard E. McArdle, and DeWitt Nelson were absent.

The following report summarizes the business matters discussed and the actions taken.

Council Polls

One of the first items of business considered by the Council was a suggestion that the published reports of Council meetings show how each Council member votes. President Martin explained that at the Council meetings during the past four years in which he has served as an officer, matters of business were ordinarily decided by unanimous vote. It was the consensus of this meeting that the vote of each Council member be recorded for the minutes, but that individual votes should not be recorded in the summarized reports of Council meetings published in the JOURNAL.

For the record, however, it should be stated that every action taken by the Council at this meeting, and hereafter reported, received the unanimous vote of all members present.

Budget for 1949

The first item for consideration was the budget for the fiscal year December 1, 1948 through November 30, 1949. The midyear audit of the Society's accounts and records, submitted June 14 by the firm of certified accountants McGinley and McGinley of Washington, D. C., shows that, of the yearly income estimated at $74,450, by May 31 $62,233 had been collected. Provided unusual membership losses do not occur as a result of the increase in dues voted in the fall of 1948, the Society should end this fiscal year with a net income for the first time since 1945.

For the information of Society members, the current annual budget as amended in June 1949 is published in Table 1.

At its meeting in December 1948 the Council authorized an additional contingent budget for emergent items to be put into effect when additional money would be in hand, keeping within the policy of nondeficit spending. The following projects were authorized in the contingent budget, priorities for which were to be set by the executive secretary with the approval of the president.

1. Membership directory together with revised Constitution and Bylaws—$2500.
2. Additional office space—$1000.
3. Eight additional pages in the JOURNAL OF FORESTRY—$2000.

The only one of these three projects specifically approved by the Council at its midyear meeting was item 1, which is discussed below.

Membership Directory Approved

In view of the probability of a small net profit for the year, the Council on motion of Col. Greeley, seconded by Mr. Evans, authorized the expenditure of up to $1,000 of the contingent appropriation for starting the membership directory which will include the Constitution and Bylaws. Information for the directory will be solicited through questionnaires addressed to each member during the coming fall, and the directory itself will be published early in 1950.

TABLE 1.—PROPOSED BUDGET FOR THE FISCAL YEAR DECEMBER 1, 1948-NOVEMBER 30, 1949, AS AMENDED JUNE 23, 1949

Estimated Expense	
JOURNAL OF FORESTRY	$23,600.00
Editor's expense	500.00
Advertising travel	100.00
Salaries—executive secretary and assistant	12,400.00
Salaries—office staff	20,860.00
Travel—officers	3,000.00
Postage	1,300.00
Telegraph and telephone	400.00
Rent	1,440.00
Multigraph and mimeograph	300.00
Miscellaneous printing	650.00
Office supplies	600.00
General expense	700.00
Depreciation	350.00
Pension plan	539.46
Natural Resources Council	200.00
Committee expense	150.00
Grading forestry schools	100.00
Annual meeting	850.00
Contributions	50.00
Council travel expense	1,250.00
Referenda	900.00
Division expense	50.00
American Institute Biological Sciences	100.00
Proceedings, contingent fund	1,500.00
Reprints, Constitution and Bylaws	100.00
Membership Directory	1,000.00
	$72,989.46
Estimated Income	
Dues	$60,000.00
Fees	3,000.00
Subscriptions and sale of JOURNALS	7,500.00
Advertising	2,400.00
Interest and dividends	500.00
Books	500.00
Reprints	150.00
Handbook of Information	200.00
Miscellaneous income	200.00
	$74,450.00
Income	$74,450.00
Expense	72,989.46
Estimated net earnings	1,460.54

However, in addition to soliciting the usual data concerning names, addresses, official affiliation, and grades of membership needed for the directory, the Society desires if possible to obtain

from each member certain additional confidential information, not for publication, with respect to income and type of professional work; this information is necessary to supply a base from which may be determined the number of foresters employed in various fields of specialization in the United States and their salary scales. Moreover, information with respect to purchasing power of the forestry profession will be sought in order to provide statistical information which will enable the Society to develop an effective advertising campaign for the JOURNAL OF FORESTRY.

Forester's Field Manual

At the meeting of the Society held in Minneapolis, December 17-20, 1947, a report was presented by a Committee on a Forester's Field Manual. The members of this committee were D. A. Anderson, S. R. Gevorkiantz, L. W. R. Jackson, the late D. G. McKeever, and R. R. Hill, chairman. (This report was published in the March 1948 issue of the JOURNAL OF FORESTRY, pages 201-205.)

By unanimous vote at the Council meeting in June 1948 the executive secretary was authorized to explore the possibilities of obtaining from some appropriate source a grant in aid to employ the services of a competent forester to take responsibility for the compilation of the manual. At the Council meeting in Boston in December 1948 the executive secretary reported that preparation of the manual will require the full-time services of an editor for at least one year or the part-time services for at least two years; and that the possibility of obtaining grants in aid from a private source was explored without success.

In view of the fact that two commercial publishers of forestry books have already solicited the privilege of publishing the field manual and inasmuch as it is practically certain that any moneys expended by the Society for this purpose will be recovered by royalties on sales, the Council at its latest meeting took the following action. On motion by Dean Dunn, seconded by Mr. Evans, it authorized the allocation of $6,000 from the general fund of the Society to be used as a revolving fund for the compilation of the forester's field manual.

The Council is confident that the expenditure will eventually be recovered by sale of the publication and that this project is an extremely desirable one professionally for the Society to undertake.

In addition the Council authorized the appointment of a three-man committee to supervise compilation of the manual. The executive secretary was further instructed to negotiate for the part-time services of a professional forester with some knowledge of this field and with suitable editorial experience.

Proceedings of Annual Meetings

Because of mechanical difficulties as well as the practical inability of including all papers now presented at annual meetings of the Society in a special issue of the JOURNAL OF FORESTRY, it was decided by the Council in 1947 to publish a special *Proceedings* issue of the 1947 annual meeting and send it to all members without charge. The cost of publishing this proceedings issue was $8,257, of which amount $603 was recovered from sales and $368 from contributions of members.

In view of this extraordinary expense, the Council at its meeting in Boston in December 1948 voted to limit the Society's financial commitment to $1,500 with the understanding that the *Proceedings* of the 1948 meeting would be made available to members at $2 per copy, and for sale to nonmembers at $3 per copy. Although it was announced in the JOURNAL and elsewhere that *Proceedings* of the meeting would be available and members were requested to notify the Society if they wished copies reserved for them, the number of such reservations totaled only about 650 and prospective sales of the *Proceedings* will probably not exceed 1,000.

In consideration of the evident implication, that only a small proportion of the Society membership desires to have the *Proceedings* of the annual meetings for their personal libraries, the Council on motion of Mr. Evenden, seconded by Mr. Spencer, voted to discontinue the automatic publication of all papers presented at annual meetings.

With respect to papers read at the forthcoming annual meeting in Seattle, October 11-14, the Council has directed that all papers shall be considered for publication in the JOURNAL OF FORESTRY on presentation by the authors; and that papers presented at an annual meeting shall be subject to the same editorial considerations as is ordinarily given other papers submitted for JOURNAL publication. In taking this action, the Council further recognizes the fact that some

papers presented at each annual meeting are not necessarily of a quality suitable for publication. Finally, it was decided that no allocation of funds will be made in the 1950 budget to publish a *Proceedings* volume.

Forestry Terminology

Following publication by the Society of the book *Forestry Terminology* in 1941, the committee which compiled it realized that certain revisions would be desirable prior to the issuance of a new edition. Accordingly, at its meeting in September 1946 the Council authorized a new Collating Committee on Forestry Terminology consisting of Albert Arnst, S. L. Frost, R. C. Hall, R. C. Hawley, and E. N. Munns, chairman.

Recently Mr. Munns reported by letter stating that the committee has taken action on all suggestions for revision, about 1600. All terms defined in the first terminology have been scrutinized, and about 300 new terms have been accepted, in addition to many changes in those previously listed.

At the time of his report (May 1949), all terms were being assembled on cards as a master manuscript, and the committee members were then preparing to review the cards before being turned over to the Society for publication. It is expected that the final manuscript will be ready for the printer during fall of 1949.

Following the reading of Mr. Munns' report, the Council on motion of Mr. Herr, seconded by Mr. Evans, expressed its thanks to him and the committee, and the executive secretary was authorized to proceed with the publication of the *Terminology*.

The 50-Year History of Forestry

In 1946, on authorization by the Council, the president appointed a committee to prepare a *History of Forestry* in America from 1900 through 1950 for publication in connection with the observance of the 50th anniversary of the Society in the year 1950. The committee in charge of this project consists of Hugh P. Baker, E. H. Frothingham, W. L. Hall, R. S. Hosmer, S. Blair Hutchinson, L. F. Kellogg, J. P. Kinney, and Robert K. Winters, chairman.

At the Society meeting in Boston in December 1948, Mr. Winters reported for the committee, recommending that the *History* be published by the Society in an attractive format and that it be released for sale and distribution in advance of the 50th annual meeting scheduled for Washington, D. C., in December 1950. He notified the Council that he would attempt to have the completed manuscript delivered by September 1, 1949 in order that it might be edited, printed, and available for reviewers not later than September 1, 1950.

On motion by Col. Greeley, seconded by Dean Dunn, the Council authorized the executive secretary to proceed with the publication of the *History* either by arrangement with a commercial publishing house or by the Society, whichever in the judgment of the executive secretary is more feasible and desirable; authorized from the general fund an amount not to exceed $5,000 for this purpose, to be recovered from sales; and expressed the desire that the publication be similar in format to the *Forestry Directory* recently published by the American Tree Association.

Advertising for the Journal

Mr. Clepper reported to the Council on advertising prospects for the JOURNAL OF FORESTRY for 1949. At the Council meeting held in Boston in December 1948 net advertising income for the current year was estimated in the budget at $2,400; by May 31 actual receipts had amounted to $1,847.

In April, in an effort to obtain more active advertising solicitation and to increase revenue from this source, President Martin authorized the appointment of Lloyd Thorpe of Seattle, Wash., as advertising representative for the JOURNAL on a commission basis. Although during the succeeding months Mr. Thorpe was able to obtain new advertising contracts, it became increasingly evident that the Society would have to risk some of the anticipated revenue in promotional work. Prior to this Council meeting, Mr. Thorpe, who has had considerable experience both in the editorial and advertising offices of trade publications, recommended to the Council a plan for promotional work intended to acquaint advertising agencies and manufacturers of products used in forestry operations with the JOURNAL and its class of readers.

After consideration, on motion by Dean Dunn, seconded by Mr. Evans, the Council accepted Mr. Thorpe's recommendation and authorized him to undertake the promotional assignment for the balance of the fiscal year (July through November), with the understanding that he would report to the Society and the Council at the annual meeting in Seattle next October at which time the Council would review the project for further possible action. The expense of con-

ducting the promotional work will be financed out of prospective advertising contracts developed by Mr. Thorpe and no expenditure of Society funds for this purpose will be necessary.

Journal of Forestry

In his capacity as managing editor, Mr. Clepper reported to the Council on the JOURNAL which is now edited in the Washington office of the Society on a temporary basis until the Society is able to set up an office of publications. On motion by Mr. Evans, seconded by Mr. Spencer, the Council reaffirmed its action taken at its meeting in June 1948 as follows:

The Council approves the establishment of a staff office on publications with qualified personnel, as the next major expansion of the annual budget. It should be the function of this office to conduct the editorial work and business management of the JOURNAL OF FORESTRY and *Forestry News*; and to handle the publication and distribution of such other publications as the Society may undertake from time to time.

Pending the establishment of this office, the Council requests the editorial board and officers of the JOURNAL OF FORESTRY to put into effect such improvements in the JOURNAL and increased advertising as they find practicable within the present budget.

In this connection it should be emphasized that the Council considers the present arrangement whereby the executive secretary serves as editor as a temporary expedient, brought about by the resignation of Dr. Hardy L. Shirley as editor-in-chief, submitted to the Council in December 1948 and effective in April 1949.

In Mr. Thorpe's recommendations for promotional work in advertising, he asked the Council to consider a change in the page size of the JOURNAL in order to permit the more efficient use of the standard 7 by 10-inch advertising layout. Without commitment as to a change in the size of the JOURNAL, the Council authorized the managing editor to develop suggested changes in the cover, page size, width and length of column, and to submit samples to the Council and the editorial board for examination at the Seattle meeting.

Membership Gains and Losses

A report on membership gains and losses as of May 31, 1949 was given by the executive secretary. He stated that the total membership as of that date was 6,284 and compared with 5,824 on May 31, 1948.

At the midyear, the membership count stood as follows:

Fellows	50
Members	2,771
Junior Members	3,000
Associate Members	187
Affiliate Members	197
Corresponding Members	52
Honorary Members	12
Inactive Members	15
Total	6,284

The number of names dropped from the membership rolls as reported in the May 1949 issue of the JOURNAL OF FORESTRY totaled 322. Of this number, 174 members had resigned and 125 had been dropped for nonpayment of dues; the remaining losses were caused by death. The number of resignations reported in May 1949 was more than double the number recorded for a similar period in 1948. However, the number dropped for nonpayment of dues in each of the two years was almost identical. From these figures it is apparent that the increase in dues voted by the membership last fall has brought about a larger, but not a serious, number of resignations. The full effect of the higher dues will not be evident, however, until the end of 1949 inasmuch as the executive office has no way of estimating how many members who are delinquent in their dues as of July 1 will fail to pay by the end of the year and be dropped.

Another factor having a bearing on membership statistics is the proportion of members who actually accept membership and start paying dues out of the total number nominated and elected. In 1948 (January through May) 296 new Junior Members accepted their elections and started paying dues. For the comparable period in 1949, the number of new Junior Members was 232.

The full effect of the change in the Constitution providing for automatic advancement to the full Member (formerly Senior Member) grade had not yet been felt up to the midyear. However, as machinery is perfected in the various Sections for full consideration of all Junior Members eligible for advancement to the Member grade, it should result in the Society recording on its books by the end of 1949 the largest number of advancements in grade during the Society's history.

Employment and Schools of Forestry

Another important phase of the membership situation was discussed by the Council; this has to do with the effect of forestry employment on

the recruitment of new members. Reports from many of the undergraduate schools of forestry indicate a decrease in employment opportunities for new graduates. In general, since the war ended forestry graduates have had little difficulty in finding suitable employment upon leaving school. Beginning in 1949, however, jobs in forestry and allied fields were markedly less plentiful than during the previous year, and in consequence fewer graduates have applied for membership in the Society or have accepted membership following election.

It was the consensus of the Council that, on the basis of observable trends, there are more forestry graduates in 1949 than there are foreseeable jobs in forestry and in allied fields. In view of the probability that some graduates of 1949 will not be able to obtain positions in forestry, the Council reviewed its resolutions of December 1947 with respect to new schools of forestry, and on motion by Mr. Herr, seconded by Col. Greeley, the Council reaffirmed that resolution as follows:

Because of the tendency of certain universities and colleges, including teachers' colleges, to offer instruction in forestry on the professional level, with faculties inadequately staffed, inadequately financed, and with inadequate facilities; and because the 35 existing schools offering professional forestry, only 22 of which are accredited by the Society of American Foresters, are sufficient to train all the foresters needed during the current postwar decade, the Council authorized the following statement on proposed new schools of forestry.

In view of the adequacy of existing schools of forestry in the United States to supply the healthy demand for professional foresters, the Council of the Society of American Foresters recommends against the establishment of new schools or departments for professional training in forestry.

The Society welcomes the introduction of nonprofessional courses in forestry in colleges and universities as a matter of general education and as a part of the training of students in agriculture.

Forestry graduates of institutions which do not meet the standards of professional training set by the Society of American Foresters are not accepted by the profession as members of the Society on the same basis as are the graduates of approved schools, and may be handicapped in securing professional recognition as, in the case of other professions, the value of such standards becomes more widely understood by the public.

Graduates of Canadian Schools

The Council next considered an exchange of correspondence between the executive office of the Society and certain deans of Canadian schools of forestry. In brief, the question has been raised by the Canadian schools as to the effect of the Society's eligibility requirements on their graduates. Inasmuch as no Canadian school has ever applied for rating or accrediting by the Council, their graduates are considered as qualifying for membership in the same manner as are graduates of nonlisted schools of forestry in the United States; that is, they are eligible after having obtained at least three years of forestry experience subsequent to graduation. In effect, the Society's membership requirements (Bylaw 5) place the Canadian schools in the same category as nonlisted institutions in the United States even though certain Canadian schools may in fact have very high standards.

Because the point at issue is one concerned largely with educational standards, the Council believes it desirable that representatives of the Committee on Accerditing of the Society of American Foresters consult with a committee of the Canadian Society of Forest Engineers in an effort to arrive at a point of agreement. By action of the Council, on motion of Col. Greeley, seconded by Dean Dunn, the chairman of the Society's Committee on Accrediting is asked to consult with representatives of the Canadian Society of Forest Engineers to discuss the problem and arrive at a mutual understanding and make recommendations.

Forestry Objectives and Policies

President Martin again called attention to the Society's lack of up-to-date statements of policies and principles, and gave illustrations of how the Council and the executive office are handicapped thereby in taking public stands on matters of national interest. He pointed out that some of the Society's policies and statements, particularly those adopted by referendum vote of only a few hundred members in the 1920s, are still in effect because they have never been rescinded. In effect, the Council and the executive office are officially bound by archiac policies and referenda which should be either modified or revoked.

At the Council meeting in June 1948 a committee on national forestry policies was authorized and charged with two duties: (1) to draft specific national objectives toward which the Society should apply itself; (2) to review all Society and policy statements either established by action of the Council or by referendum of the membership, with the hope of eliminating those

now out of date and inapplicable to present conditions, the revision of others when necessary, and the retention of those of permanent importance.

Because the chairman appointed to this committee job was unable to see it through by reason of pressure of his official duties, the Council, on motion by Col. Greeley, seconded by Mr. Herr, authorized the president to appoint a new committee to review and bring up to date all policy statements.

Section Chapters

By this time all members of the Society are familiar with the fact that the Council and the Sections have been studying for several years the best manner of giving official recognition of those units of Section members variously known as subsections, local groups, and forestry forums. At the meeting of the Society in Boston in December 1948, a joint conference of the Council and Section delegates was held to consider the need for, and wording of, a proposed bylaw. The manifest need for a bylaw officially recognizing these membership units was evident in that some Sections were unable to return a portion of the dues to the local groups for the conduct of business because those groups had no official status. Moreover, in some cases the smaller groups were passing resolutions and taking similar action in the name of the Society without, however, actually possessing official right to do so.

Realizing that it is essential to recognize these smaller groups officially and to provide the necessary warrant for them to function within the framework of the Sections, the Council submitted a proposed bylaw in March 1949 to all the Sections with the request that they should consider it and make recommendations to the Council at its June meeting. Responses having been received from 14 of the 21 Sections, and believing that further delay was unnecessary in view of the long period of time during which this matter has been debated, President Martin appointed a Council committee of three (Messrs. Dunn, Evans, and Herr) to review the Section recommendations and to revise the proposed bylaw in the light of those recommendations for Council consideration.

Accordingly the Council, on motion of Col. Greeley, seconded by Dean Dunn, unanimously approved the following recommended bylaw which becomes effective with this publication of it.

A Chapter of any Section may be authorized by the officers or executive committee of the Section upon written petition of fifteen (15) or more voting members of the Section resident in an area where a strong local organization may be effected. The boundaries of a Chapter shall be established by the Section on recommendations from the members concerned.

Chapters shall hold at least one meeting each year to retain their authorization. Open meetings are specifically authorized.

The officers of each Chapter shall include a chairman, a vice chairman, and a secretary-treasurer, who shall be voting members of the Society, serving concurrently with the officers of the Section, and elected by the members of the Chapter. A current list of the officers and the members of each Chapter shall be on file with the secretary of the Section.

A Section is authorized to appropriate funds to the Chapter for the conduct of its business.

Actions or recommendations of a Chapter on Society matters will be transmitted to the Council with the recommendation of the Section. The Section shall have the right to rescind the authorization of any Chapter and to terminate its existence.

The O. & C. Referendum

Last October a petition signed by 129 voting members of the Society was submitted to the Council. The petitioners requested the Council to authorize a referendum on a provision of Senate bill 580 of the 80th Congress which would have authorized a transfer of the administrative jurisdiction of some 462,000 acres of controverted land in Oregon from the U. S. Forest Service to the Bureau of Land Management of the Department of the Interior.

This petition, together with certain explanatory material, was published in the JOURNAL OF FORESTRY for February 1949 (pages 153-155).

At the meeting of the Council held in Boston in December 1948, the referendum was approved. The executive secretary was instructed to submit it to the Society membership for mail vote in accordance with Article VII, Section 3 of the Constitution and Bylaw 54. Moreover, the Council directed that when the ballot was mailed out, it should be accompanied by explanatory statements in opposition to, as well as in support of, the petition so that when voting the members might have both sides of the question.

Bylaw 54 provides that referendum ballots shall be mailed out only after the members have received at least two issue of the JOURNAL subsequent to the original publication of the proposal. Inasmuch as original publication occurred in the February 1949 issue, April was the earliest month that the ballots could be distributed. Accordingly, plans were made in the Society's executive office to send out the ballots in April.

However, shortly after the February issue of the JOURNAL appeared, a second petition, dated February 16, 1949, was initiated in the Columbia River Section. It asked the Council not to submit the issue to vote and requested that action on the proposed referendum be stopped. This petition was published in the June 1949 issue of the JOURNAL OF FORESTRY, pages 500-503.

In view of these conflicting petitions, the Council in April took action, based on a legal opinion obtained from an attorney-at-law, to authorize a vote first on the second petition, and then on the referendum itself. A detailed discussion of the legal opinion and the Council's action was published, as mentioned in the June issue of the JOURNAL. Under the Constitution and Bylaws, two issues of the JOURNAL must appear subsequent to the one in which a petition is published, before ballots on a referendum or a a vote can be held. Accordingly, August is the earliest month in which ballots could be sent to the members.

At the recent Council meeting these controversial petitions were again reviewed. Then on motion by Col. Greeley, seconded by Mr. Evans, it was voted to proceed without further delay to submit the referendum to the membership in August.

The Right of Appeal by Petition

In view of the two conflicting petitions submitted to the Council with respect to the O. & C. controversy, it is evident that Bylaw 54 does not provide appropriate means for handling opposing appeals to the Council. It was the consensus of the Council that the third paragraph of Bylaw 54 has been proved inoperative. It now reads as follows:

Appeal against actions or positions taken by the Council shall not operate as an injunction against said action in matters of immediate importance as affecting public or other measures in which delay might cause the Society and profession to suffer damage, and in which the Council has reasonable grounds for believing that it represents the majority opinion of the members, or on which the Society has previously determined its position. The right of appeal by petition of a small group shall not thus operate to thwart the purposes of the Society as interpreted by the elected Council, but shall serve, in absence of voluntary submission of a referendum by the Council, to bring about a determination, after proper discussion and deliberation by the membership, of any action of the Council as defined in Article VII, Sec. 3.

In order that the Council shall have clearcut responsibility with respect to petitions and appeals, the following amended third paragraph of Bylaw 54, on motion of Col. Greeley, seconded by Dean Dunn, was approved and ordered to be submitted to the full Council membership for adoption or rejection.

The right of appeal by petition, as provided and limited in Article VII, Sec. 3, shall lie against any action or position taken by the Council; provided that in the case of conflicting petitions or petitions opposing a referendum previously initiated by the Council but not yet completed, the Council shall determine the course deemed best for the orderly and effective management of Society affairs.

Constitutional Amendment Needed

In a further effort to provide for proper consideration and handling of appeals by petition, the Council concurred in the belief that Article VII, Sec. 3 of the Constitution with respect to the number of signatures required on a petition to appeal should be changed. The pertinent provision of Article VII, Sec. 3 now reads as follows:

"Any action of the Council may be brought before the Society at large on written petition of not less than fifty voting members."

By action of the Council, on motion of Col. Greeley, seconded by Mr. Spencer, this sentence shall be submitted to the voting membership for amendment as follows:

Any action of the Council may be brought before the Society at large on written petition of not less than 250 voting members representing at least three different Sections with at least 25 members from each.

Professional Base of Society Membership

At the Council meeting held in June 1948 a special Committee on Membership Requirements and Dues (W. B. Greeley, chairman) submitted a report which was the basis for certain constitutional amendments, including the increase in dues, voted by the membership in November 1948.

But one portion of this committee report was not submitted for referendum ballot last fall because of dissatisfaction with it expressed by the Intermountain Section which requested further opportunity for discussion and possible revision. The item in question was "1. Professional Base of Society Membership," published in the JOURNAL for August 1948, page 622. Additional correspondence on this subject has since been published in the JOURNAL.

At the Council meeting in Boston in December 1948, Col. Greeley recommended a redraft of the questions proposed for referendum vote as approved in June 1948. He recommended that the

membership be given two choices to vote on: (1) to retain the present membership requirements, or (2) to liberalize membership requirements. On this basis the Council approved publication of the redraft of the proposed referendum, inviting suggestions to be considered at its meeting in June 1949. (See the JOURNAL for February 1949, page 152.) The three questions follow

1. Shall the present professional base for membership be retained?

2. Shall Junior Membership be open to men of professional training, equivalent to that required in forestry, in any form of wild land management, such as range, wildlife, recreation, water and soil, without distinction as to cover types, who have had:

(a) Either professional training in forestry equivalent to 25 percent of that required of an accredited school of forestry?

(b) Or three years experience in any form of wild land management, together with a demonstrated interest in forestry?

3. Shall membership be open to men without training or experience in forestry, but with equivalent professional training or experience in any form of wild land management, range, wildlife, recreation, water and soil, without distinction as to cover types?

At the Council's recent meeting, Col. Greeley explained that number *2* proposal is not agreeable to some of the Intermountain Section members, though he believes that number *3* proposal will satisfy the range management men who have insisted that they be admitted to membership on their range qualifications without regard to their qualifications in forestry. It was the consensus of the Council that further attempts at modifications of proposition number *2* will not clarify the matter and that the three proposals should be offered the membership on a ballot.

The Council, on motion of Col. Greeley, seconded by Mr. Evans, authorized a referendum on the above three questions as printed in the February 1949 issue of the JOURNAL, page 152.

The executive secretary was instructed to obtain statements from proponents of the three viewpoints for publication in the October issue of the JOURNAL.

The Council, on motion of Mr. Evans, seconded by Mr. Spencer, requested that Col. Greeley prepare a statement on the effect of each of the three proposals for publication in the JOURNAL OF FORESTRY and for the guidance of the voting members, prior to submission of the referendum vote.

In order to obtain a decisive vote on what will actually result in an amendment of the Constitution, the members will be asked to ballot as follows:

A. Shall the present professional base for membership be retained?
- ☐ **Yes**
- ☐ **No**

B. If you favor a liberalization of membership requirements, which of *2* or *3* do you prefer?
- ☐ **2**
- ☐ **3**

Members who vote *yes* on proposition *A* will not vote on proposition *B*. Members who vote *no* under proposition *A* shall then vote for either item *2* or item *3* under proposition *B*. In short, if two-thirds of those who vote favor retaining the present base for membership, the Constitution will not be amended.

If, however, the sum of votes for items *2* and *3* of proposition *B* gives a two-thirds majority of the total number of votes cast, then the Constitution will be amended according to whichever vote on *2* or *3* is the higher.

Committee on Natural Areas

The Committee on Natural Areas, which functioned as a committee of the whole Society and which submitted a splendid report at the Society meeting in Boston in December 1948, requested that it be discharged with the publication of its report. (See JOURNAL OF FORESTRY for February 1949, pages 137-147.)

In order, however, that the listing of forest cover types within natural areas may be kept up to date, the Council voted to authorize a small committee to continue this work, to be attached functionally to the Division of Silviculture for supervision and guidance. The Committee on Natural Areas now consists of Jesse H. Buell, Neil W. Hosley, and John F. Shanklin, chairman.

Section Officers Handbook

The executive office has in process of compilation a handbook for Section officers which will help guide them in conducting business, holding meetings, handling membership, and in the performance of other appropriate activities. The Council expressed the hope that this publication could be made available to the Sections before the Seattle meeting in October.

Seattle Meeting

The executive secretary reported on arrangements and programs for the national meeting of the Society to be held in Seattle, October 11-14. The preliminary program is published elsewhere in this issue.

By authority of the Council, another joint meeting of the Council and official delegates from the Sections will be held as a premeeting conference on the afternoon of Monday, October 10, in Seattle.

The Society will also participate in the dedication of the Gifford Pinchot National Forest (formerly the Columbia National Forest in Washington) on the morning of Saturday, October 15.

50th Anniversary Meeting

By action of the Council, approval was given to arrangements made by the executive secretary for holding the 50th anniversary meeting of the Society in Washington, D. C. on December 14, 15, and 16, with headquarters at the Mayflower Hotel.

Early commitments and advance reservations of conference rooms were made necessary by reason of the observance during 1950 of the bicentennial of the founding of Washington, D. C. and the consequent anticipated competition for meeting dates and hotel accommodations by national organizations.

Acknowledgments

By unanimous vote the Council expressed its thanks to the following individuals who helped arrange both this conference and the joint meeting with the Black Hills Chapter of the Central Rocky Mountain Section held at Sylvan Lake Hotel on Friday evening, June 24: John W. Spencer, regional forester, U. S. Forest Service, Denver, Colo.; Harry W. Woodward, state forester of South Dakota, Pierre; Harry Herbst, manager of the State Game Lodge, Hermosa, S. D.; James Estes of the Homestead Mining Corp., Spearfish, S. D.; Marion J. Webber, supervisor of the Harney National Forest, and his staff, Custer, S. D.; and Clarence C. Averill, supervisor of the Black Hills National Forest, and his staff, Deadwood, S. D.

Central States Section Meeting

The Central States Section will hold a meeting at Cairo, Ill., October 27-29.

Details of the program may be obtained from Donald W. Winters, Box 134, Murphysboro, Ill.

Opposing Explanatory Statement on the O. and C. Petition

In the February issue of the JOURNAL (pages 153-155) there was published a petition, together with an explanatory statement, requesting the Council to authorize a Society referendum. The particular subject on which the petitioners requested a vote was a provision in proposed Senate bill 580 to permit the transfer of some 462,000 acres of national forest from the Forest Service, U. S. Department of Agriculture, to the Bureau of Land Management, Department of the Interior.

A statement, entitled "Objectives of the Petitioners," in explanation and support of the petition was published with it. At the time the Council voted to approve the referendum, it announced that when the ballot is submitted for vote a second statement would accompany it in order to provide an opposing viewpoint so that members may consider both sides of the question.

This opposing viewpoint follows. Members who desire to review the entire matter in detail are referred to the JOURNAL for February (page 153), for June (page 503), and for July (pages 588-589).

Statement in Behalf of S. 580 of the 80th Congress (S. 148, 81st Congress)

All members of the Society of American Foresters, as a result of a petition submitted by a number of the members, are asked to vote on the provisions of bill S. 580 of the 80th Congress. This bill passed the Senate in 1948 and was stopped in the House. A similar measure (S. 148, Sen. Cordon) has been introduced into the 81st Congress.

The question to be answered by the referendum is, "Are you in favor of the bill?"

It is unfortunate that the Society should become embroiled in a bitter political controversy and in a jurisdictional dispute between two departments of the government on a matter which is far afield from the true function of a professional society.

It is even more unfortunate that those who seek the Society referendum do so on a platform of "Let's continue the controversy," rather than one of "Let's get the controversy decided so that a constructive program of forest management may proceed." Enactment of the bill (S. 148) would accomplish that latter objective.

It is because we favor settlement of the controversy that we submit the following statement in support of this bill:

The measure affects the administration and management of 462,731 acres of federal forest land located in 9 of the 18 land grant counties of western Oregon, which were formerly a part of the area granted to the Oregon and California Railway by Congress. This area in question represents unsurveyed odd sections located within the indemnity limits of the grant at the time of the revestment.

To clarify the past history of these lands, the following excerpt is taken from Report No. 378 of the Senate Committee on Public Lands and Surveys of the 78th Congress:

> The lands affected by this proposed legislation are a part of an early railroad land grant in the State of Oregon. The Government recaptured title to the grant lands by the act of June 9, 1916, due to violation by the grantee railroad company of certain terms of the grant. The recapture act provided for revestment of all the unsold portion of the grant "for which patents have been issued by the United States or for which the grantee is entitled to receive patents under the grant." The lands herein concerned are of the latter class.
>
> Prior to 1916, a great portion of the grant lands were patented and on the county tax rolls. The lands here under consideration had not then been patented, due to being unsurveyed. All these matters were determined by the courts many years ago.
>
> The 1916 act provided for administration of the revested lands by the Interior Department, for getting the lands into private ownership, and for reimbursement of the counties for their tax loss.
>
> On August 28, 1937, the Congress enacted a statute providing for a different disposition and administration of the lands in the interest of conservation. Thereafter two questions arose as to the status of the unpatented portion of the revested grant: First, was the Department of Agriculture to administer them under national forest laws, or the Department of the Interior under the 1916 act, as amended; second, should the receipts from the lands be distributed the same as receipts from the patent lands.

A review of this excerpt, coupled with a study of the history of legislative proceedings, reveals the following facts:

1. The 462,731 acres involved in the present controversy were revested to the United States by the Act of June 9, 1916.

2. Administration of these properties was assigned to the Interior Department by the Act of June 9, 1916.

3. These lands were specifically referred to during the proceedings leading to the enactment of the 1937 O. & C. sustained yield legislation, yet no exception was taken to their inclusion with other O. & C. lands at the time the 1937 act was enacted.

4. The present legislation would continue these lands in O. & C. status, but more important still is the fact that *it would unscramble all O. & C. and national forest lands, and thus permit forest management to proceed without continual jurisdictional controversy.*

The controversy continues to the present date and S. 580 of the 80th Congress and S. 148 of the 81st Congress attempt to settle the controversy by authorizing an exchange of O. & C. lands and national forest lands on an equal valuation basis. The exchange would be made so as to separate completely the two land ownerships into consolidated blocks and to place each under its separate jurisdiction. Legislation of this nature would do away with the long-standing argument over the controverted lands. It would provide for a settlement of the controversy in an equitable manner through the exchange provisions, thus actually protecting the land interests of the Forest Service and the Oregon and California Revested Lands Administration, at the same time making provisions to safeguard the interests of the counties involved.

W. D. HAGENSTEIN
RICHARD S. KEARNS
E. H. MCDANIELS
DAVID T. MASON
STUART MOIR

Announcement of Candidates for Membership

The following names of candidates for membership are referred to the membership for comment or protest. The list includes all nominations received since the publication of the July JOURNAL without question as to eligibility. Names, addresses, education, and endorsements are given. The names have not been passed upon by the Council. Important information regarding the qualifications on any candidate which will enable the Council to take final action with a knowledge of essential facts should be submitted before September 15, 1949. Statements on different men should be submitted on different sheets. Communications relating to candidates are considered as strictly confidential.

Allegheny

Junior Membership

Armstrong, G., Center Ave., Mt. Pocono, Pa.; Pa. State, B.S.F., 1949. H. H. Chisman, V. A. Beede, M. W. Humphrey.

Crider, P. F., Jr., 510 N. 3rd Street, Jeannette, Pa.; Univ. of Mich., B.S.F., 1949. W. W. Chase, S. T. Dana, E. C. O'Roke.

Eastment, Robert R., 691 Franklin Ave., Nutley 10, N. J.; N. Y. State, B.S.F., 1949. J. S. Illick, H. L. Shirley, L. P. Plumley.

Garvey, W. E., Jr., Asst. Dist. Forester, Dept. of State Forests & Parks, Annapolis, Md.; N. Y. State, B.S.F., 1949.

Hocker, H. W., Jr., Farm Forester, State of Pa.; Harrisburg, Pa.; Pa. State, B.S.F., 1949. H. H. Chisman, V. A. Beede, H. A. Meyer.

Johnston, R. B., 67 Hillcrest Rd., W. Caldwell, New Jersey; N. Y. State, B.S.F., 1949. J. S. Illick, H. L. Shirley, L. P. Plumley.

Koch, W. W., 164 Stiles St., Elizabeth, New Jersey; Pa. State, B.S.F., 1949. H. H. Chisman, V. A. Beede, H. A. Meyer.

Schultz, C. E., 148 Beekman Rd., Summit, N. J.; N. Y. State, B.S.F., 1949. J. S. Illick, H. L. Shirley, L. P. Plumley.

Zimmerman, R. O., 427 Van Renssalaer Center, Ridgefield, New Jersey; N. Y. State, B.S.F., 1949. J. S. Illick, H. L. Shirley, L. P. Plumley.

Member Grade

Parr, W. A., Dist. Forester, Md. Dept. of Forests and Parks, Cumberland, Md.; Cornell Univ., B.S.F., 1936. Allegheny (Jr. member, 1945).

Appalachian

Junior Membership

Nims, W. H., Jr., Box 33, Fort Mill, S. C.; Univ. of Ga., B.S.F., 1949. A. E. Patterson, G. N. Bishop, D. J. Weddell.

Nuite, C. W., Forest Director, Poinsett State Forest, Wedgefield S. C.,; Univ. of Ga., B.S.F., 1927. Reinstatement.

Tetterton, S., Forester, Sunny Hill Plantation, Camden, S. C.; Univ. of Ga., B.S.F., 1949. A. A. Lehocky, V. H. Cutler, E. B. Price.

Member Grade

Sexton, W. A., Asst. Forester, W. Va. Pulp and Paper Co., Summerville, S. C.; N. C. State, (2 yrs.). Appalachian (Jr. member, 1946).

Central Rocky Mountain

Junior Membership

Meierstein, G. W., Forester, Corps of Engineers, Omaha, Nebraska; Iowa State, B.S.F., 1947. G. B. Hartman, L. F. Kellogg, D. W. Bensend.

Wicks, W. W., Primrose, Neb.; Iowa State, B.S.F., 1949. G. B. Hartman, L. F. Kellogg, G. B. MacDonald.

Central States

Junior Membership

Ashley, Roger H., 607 E. Hoover St., Ann Arbor, Mich.; Univ. of Mich., B.S.F., 1949. S. W. Allen, D. V. Baxter, J. W. Brown.

Clark, F. B., 508 E. Wood Street, Hillsboro, Ill.; Purdue Univ., B.S.F., 1949. A. M. Herrick, T. E. Shaw, R. C. Brundage.

Freytag, M. A., 1121 Wellman, Massillon, Ohio; N. Y. State, B.S.F., 1949. J. S. Illick, H. L. Shirley, L. P. Plumley.

Grist, R. P., R.D. 1, New Middletown, Ohio; Iowa State, B.S.F., 1949. G. B. Hartman, G. B. MacDonald, G. W. Thomson.

Link, J. E., 104 South Jackson St., Waukegan, Ill.; Univ. of Mich., B.S.F., 1949. John Carow, S. W. Allen, S. T. Dana.

Miskovsky, M. C., 4106 West 21st Place, Chicago, Ill.; Univ. of Mich., B.S.F., 1948; M.F., 1949. S. T. Dana, J. W. Brown, Frank Murray.

Veverka, R. M., 3683 West Park Rd., Cleveland, Ohio; Pa. State, B.S.F., 1949. H. H. Chisman, V. A. Beede, M. W. Humphrey.

Wainscott, T. L., 628 West Lincoln Ave., Belvidere, Ill.; Univ. of Mich., B.S.F., 1949. S. W. Allen, John Carow, J. W. Brown.

Columbia River

Junior Membership

Grosh, E. R., Dist. Asst., Rand Rgr. Sta., Merlin, Oregon; Oregon State (2½ yrs.). Columbia River.

Johnson, R. W., Inventory Forester, Weyerhaeuser Tbr. Co., Longview, Wash.; Univ. of Minn., B.S.F., 1941. J. M. Hisey, D. S. Jeffers, D. Borglum.

Lecklider, G. R., 216 Kings Road, Corvallis, Oregon; Oregon State, B.S.F., 1949. D. D. Robinson, G. H. Barnes, W. F. McCulloch.

McLendon, M. D., Forestry Aide, U.S.F.S., Prineville, Oregon; Oregon State, B.S.F., 1949. G. H. Barnes, R. F. Keniston, W. F. McCulloch.

Mouser, W. E., 2000 Daniels, Vancouver, Wash.; Univ. of Wash., B.S.F., 1949. J. C. H. Robertson, P. G. Haddock, C. F. Brockman.

Powers, R. D., Box 261, Corvallis, Ore.; Oregon State, B.S.F., 1949. Paul M. Dunn, J. R. Dilworth, H. Nettleton.

Shrum, T. E., Jr., Glide, Oregon; Oregon State, B.S.F., 1949. W. A. Davies, P. M. Dunn, R. G. DeMoisy.

Wilson, W. R., Forester, U.S.F.S., Seneca, Ore.; Univ. of Wash., B.S.F., 1949. J. C. H. Robertson, P. G. Haddock, B. L. Orell.

Wood, D. D., 4524 S.E. 45th Ave., Portland, Ore.; Oregon State, B.S.F., 1949. G. H. Barnes, H. G. Nettleton, R. F. Keniston.

Worstell, R. L., Dist. Clerk, U.S.F.S., Foster, Ore.; Oregon State, B.S.F., 1949. J. R. Dilworth, D. D. Robinson, W. F. McCulloch.

Gulf States

Junior Membership

Bonner, J. D., R.F.D. #1, Heidelberg, Miss.; La. State, B.S.F., 1949. C. O. Minor, W. M. Palmer, A. B. Crow.

Carlton, C. F., Dist. Forester, Nebo Oil Co., Good Pine, La.; La. State, B.S.F., 1949. W. M. Palmer, Jr., L. B. Blackwell, C. D. Mattson.

Gatlin, E. R., Rt. 2, Gulfport, Miss.; Univ. of Ga., B.S.F., 1949. A. E. Patterson, G. N. Bishop, D. J. Weddell.

Hansbrough, T., North La. Hill Farm Exp. Sta., Homer, La.; La. State, B.S.F., 1949. R. W. Hayes, M. B. Applequist, W. M. Palmer.

Lapham, V. T., Univ. Sta., Baton Rouge, La.; La. State, B.S.F., 1949. R. W. Hayes, M. B. Applequist, W. M. Palmer.

Inland Empire

Junior Membership

Hazelbaker, D. L., Kingston Ranger Sta., Kingston, Idaho; Univ. of Idaho, B.S.F., 1949. T. S. Buchanan, D. L. Arnold, M. E. Deters.

Robins, C. M., 707 Wallace Ave., Coeur d'Alene, Idaho; Univ. of Idaho, B.S.F., 1949. M. E. Deters, E. Wohletz, T. S. Buchanan.

Russell, T. E., U.S.F.S., Avery, Idaho; Pa. State, B.S.F., 1949. H. N. Cope, H. H. Chisman, V. A. Beede.

Zellner, R. A., Potlatch Forests, Inc., Lewiston, Idaho; Univ. of Maine, B.S.F., 1949. H. E. Young, A. G. Randall, R. I. Ashman.

Kentucky-Tennessee

Junior Membership

Braden, E. M., Jr., Dist. Forester, Lexington, Tenn.; La. State B.S.F., 1948. Ralph W. Hayes, M. B. Applequist, L. L. Glasgow.

Cockroft, W. S., Asst. Sales Mgr., C. M. Gooch Lbr. Co., Memphis, Tenn.; La. State, B.S.F., 1949. R. W. Hayes, C. O. Minor, M. B. Applequist.

New England

Junior Membership

Keller, R. C., Forester, E. S. Byrant, Bolton, Vt.; N. Y. State, B.S.F., 1949. J. S. Illick, Hardy L. Shirley, L. P. Plumley.

Orcutt, E. J., Gen. Mgr., Heald Mill Supply, Inc., Augusta, Me.; Univ. of Me., B.S.F., 1949. R. I. Ashman, Gregory Baker, F. K. Beyer.

New York

Junior Membership

Barzler, W. J., 1117 Parkwood Blvd., Schenectady, N. Y.; N. Y. State, B.S.F., 1949. J. S. Illick, H. L. Shirley, L. P. Plumley.

Bielejec, J. H., 129 Furnace Street, Little Falls, New York; N. Y. State, B.S.F., 1949. J. S. Illick, H. L. Shirley, L. P. Plumley.

Christensen, W. W., 30 East Street, Binghampton, N. Y.; Univ. of Mich., B.S.F., 1949. S. T. Dana, W. W. Chase, S. W. Allen.

Flink, P. R., 166 Summit Ave., Mt. Vernon, N. Y.; N. Y. State, B.S.F., 1949. J. S. Illick, H. L. Shirley, L. P. Plumley.

Fonda, D. V., 51 Franklin Ave., New Rochelle, N. Y.; N. Y. State, B.S.F., 1949. J. S. Illick, H. L. Shirley, L. P. Plumley.

Hamill, Louis, Forestery Survey, U.S.F.S., Warrensburg, N. Y.; N. Y. State, B.S.F., 1949. J. S. Illick, H. L. Shirley, L. P. Plumley.

Hanlon, J. A., Forest Gen. Foreman, Cons. Dept., Lowville, N. Y.; N. Y. State, (Land Engr.), (2 yrs.). New York.

Heinemann, G. L., 59 Croydon Road, Rochester, N. Y.; N. Y. State, B.S.F., 1949. L. P. Plumley, R. J. Hoyle, R. M. Hutchinson.

Labson, K. B., Jr., 32 Judson St., Canton, N. Y.; N. Y. State, B.S.F., 1949. J. S. Illick, H. L. Shirley, L. P. Plumley.

McLean, John H., 337 Malverne Drive, Syracuse, N. Y.; N. Y. State, B.S.F., 1949. F. E. Carlson, J. E. Davis, R. C. Unger.

Meyering, J. R., 35 Juniper St., Rochester 10, N. Y.; N. Y. State, B.S.F., 1949. J. S. Illick, H. L. Shirley, L. P. Plumley.

Minnick, D. W., Asst., Roosevelt Wildlife Exp. Sta., Syracuse, N. Y.; N. Y. State, B.S.F., 1949. J. S. Illick, H. L. Shirley, L. P. Plumley.

Moore, A. D., R.D. #3, Norwich, N. Y.; N. Y. State, B.S.F., 1949. J. S. Illick, H. L. Shirley, L. P. Plumley.

Mueser, A. W., Clinton Corners, Dutchess County, N. Y.; N. Y. State, B.S.F., 1949. J. S. Illick, H. L. Shirley, L. P. Plumley.

Nigro, J. F., Cons. Aid, U. S. Cons. Service, Millbrook, N. Y.; N. C. State, B.S.F., 1940. S. E. Coutant, H. G. Strait, E. D. Brockway.

Rothwell, R. J., Soil Scientist, S.C.S., Fonda, N. Y.; N. Y. State, B.S.F., 1949. J. S. Illick, H. L. Shirley, E. P. Plumley.

Sandstrom, A. C., Tree Surgeon, Lewis Tree Expert Co., Syracuse, N. Y.; N. Y. State, B.S.F., 1948. J. S. Illick, H. L. Shirley, L. P. Plumley.

Shearer, T. D., 410 Folts St., Herkimer, N. Y.; N. Y. State, B.S.F., 1949. J. S. Illick, H. L. Shirley, L. P. Plumley.

Strong, D. E., R.D. #3, East Syracuse, N. Y.; N. Y. State, B.S.F., 1949. J. S. Illick, H. L. Shirley, L. P. Plumley.

Van Scoy, L. F., 1 Hall Ave., White Plains, N. Y.; N. Y. State, B.S.F., 1949. J. S. Illick, H. L. Shirley, L. P. Plumley.

Northern California

Junior Membership

Britton, L. R., Coordinating Fire Dispatcher, U.S.F.S., Eureka, Calif.; Univ. of Calif., B.S.F., 1948. W. F. Fischer, V. C. Hallin, E. L. Baughn.

Clapp, A. K., 887 Indian Rock Ave., Berkeley, Calif.; Univ. of Calif., B.S.F., 1949. J. Kittredge, W. Mulford, M. Krueger.

Joos, Peter J., 338 Butterfield Rd., San Anselmo, Calif.; Univ. of Calif., B.S.F., 1948. F. S. Baker, Emanuel Fritz, M. Krueger.

Nordyke, J. P., 744 Keeler Ave., Berkeley, Calif.; Univ. of Calif., B.S.F., 1949. M. Krueger, F. S. Baker, R. A. Cockrell.

Northern Rocky Mountain

Junior Membership

Giles, T. F., Seasonal Ranger Natl. Park Service, Yellowstone Park, Wyo.; Univ. of Idaho, B.S.F., 1949. M. E. Deters, T. S. Buchanan, P. D. Dalke.

Rapp, A. J., Jr., Headquarters Guard, U.S.F.S., Ennis, Mont.; Mont. State, B.S.F., 1949. F. G. Clark, M. S. Morris, T. C. Spaulding.

Ozark

Junior Membership

Graham, G. C., Box 252, Siloam Springs, Ark.; Univ. of Idaho, B.S.F., 1949. M. E. Deters, E. Wohletz, T. S. Buchanan.

Lodge, G. R., Farm Forester, Mo. Cons. Comm., Jefferson City, Mo.; Univ. of Mich., B.S.F., 1949. G. O. White, A. B. Meyer, P. H. Degler.

Puget Sound

Junior Membership

Aston, E. R., Logging Mgr., Biles Coleman Lbr. Co., Omak, Wash. Puget Sound (Affiliated Member, 1944).

Beswick, R. A., Cons. Asst., Wash. State Div. of Forestry, Vancouver, Wash.; Univ. of Wash., B.S.F., 1949. B. L. Orell, J. C. H. Robertson, P. G. Haddock.

Brinsfield, W. R., 415 30th Avenue, Seattle, Wash.; Univ. of Wash., B.S.F., 1949. P. G. Haddock, J. C. H. Robertson, B. L. Orell.

Burwell, R. W., Assoc., Grogan Donaldson & Tulloch, Tacoma, Washington; Univ. of Wash., B.S.F., 1929. B. L. Orell, J. C. H. Robertson, J. K. Pearce.

Collins, T. E., Field Asst., Forest Products Inst., Seattle, Wash.; Univ. of Wash., B.S.F., 1949. J. K. Pearce, G. D. Marckworth, B. L. Orell.

Corlett, J. B., Asst., U.S.F.S., Packwood, Wash.; Univ. of Wash., B.S.F., 1949. J. C. H. Robertson, B. L. Orell, P. G. Haddock.

England, R. F., Research, Forest Products Inst., Seattle, Wash.; Univ. of Wash., B.S.F., 1949. J. K. Pearce, G. D. Marckworth, B. L. Orell.

Hauberg, J. H., Jr., Forester, Pacific Denkmann Co., Seattle, Wash.; Univ. of Wash., B.S.F., 1949. J. K. Pearce, G. D. Marckworth, B. L. Orell.

Lazara, M, P., P.O. Box 295, Renton, Wash.; Univ. of Wash., B.S.F., 1943; M.F., 1949. J. C. H. Robertson, P. G. Haddock, B. L. Orell.

McDowell, H. G., Tbr. Sales Asst., Mt. Baker Natl. Forest, Bellingham, Wash.; Univ. of Wash., B.S.F., 1949. J. C. H. Robertson, P. G. Haddock, C. F. Brockman.

Sieber, D. H., Instrument Man, Weyerhaeuser Tbr. Co., Chehalis, Wash.; Univ. of Wash., B.S.F., 1949. J. K. Pearce, O. H. Schrader, Jr., H. D. Erickson.

Walker, G. F., Aerial Photographer, Harold Aerial Photos, Seattle, Wash.; Univ. of Wash., B.S.F., 1949. B. L. Orell, J. C. H. Robertson, P. G. Haddock.

Walkley, R. B., S. Slocan, B. C., Canada; Univ. of Idaho, B.S.F., 1949. M. E. Deters, T. S. Buchanan, P. D. Dalke.

Webb, W. L., Star Rt. 1, Box 29, Lilliwaup, Wash.; Univ. of Wash., B.S.F., 1949. P. G. Haddock, J. C. H. Robertson, B. L. Orell.

White, J. A., Forester, St. Regis Paper Company, Tacoma, Wash.; Oregon State, B.S.F., 1949. D. D. Robinson, R. F. Keniston, W. F. McCulloch.

Southeastern

Junior Membership

Allan, H. W., Asst. Proj. Forester, Fla. Forest and Park Service, Panama City, Fla.; Univ. of Fla., B.S.F., 1949. E. A. Ziegler, J. W. Miller, T. G. Herndon.

Anderson, S. L., Forester, Armstrong Cork Co., Tree Farms Inc., Macon, Ga.; Univ. of Ga., B.S.F., 1947; Duke Univ., M.F., 1948. B. F. Grant, J. D. Fountain, D. J. Weddell.

Brett, Fred, Jr., Box 437, Crestview, Fla.; Univ. of Fla., B.S.F., 1949. H. S. Newins, E. A. Ziegler, T. G. Herndon.

Carr, C. D., Lower Cairo Rd., Thomasville, Georgia; Univ. of Ga., B.S.F., 1949. G. N. Bishop, D. J. Weddell, A. E. Patterson.

Conger, S. H., 1106 Anthony Rd., Augusta, Ga.; Univ. of Ga., B.S.F., 1949. A. E. Patterson, D. J. Weddell, G. N. Bishop.

Crawford, J. M., Jr., Route 5, Commerce, Ga.; Univ. of Ga., B.S.F., 1949. A. E. Patterson, G. N. Bishop, D. J. Weddell.

Davis, R. A., 984 Oglethorpe Ave., Atlanta, Ga.; Univ. of Ga., B.S.F., 1949. A. E. Patterson, G. N. Bishop, D. J. Weddell.

Exley, G. C., Springfield, Ga.; Univ. of Ga., B.S.F., 1949. A. E. Patterson, G. N. Bishop, D. J. Weddell.

Harper, R. S., I & E Forester, Fla. Forest Service, Tallahassee, Fla.; Univ. of Ga., B.S.F., 1948. D. J. Weddell, A. E. Patterson, L. W. R. Jackson.

Hoisington, R. E., 840 Forest Ave., Rye, New York; Univ. of Fla., B.S.F., 1949. T. G. Herndon, C. G. Geltz, J. W. Miller, Jr.

Hurlbutt, Boris, Route 4, Augusta, Ga.; Univ. of Ga., B.S.F., 1949. A. E. Patterson, G. N. Bishop, D. J. Weddell.

Jones, W. H., Asst. Forester, Fla. Forest Service, Tallahassee, Fla.; Univ. of Ga., B.S.F., 1949. A. E. Patterson, G. N. Bishop, D. J. Weddell.

Kelly, A. W., Jr., 716 S. Orleans Ave., Tampa, Fla.; Univ. of Fla., B.S.F., 1949. T. G. Herndon, C. G. Geltz, J. W. Miller, Jr.

Lawrence, P. L., Forester, Knox Corp., Thomson, Ga.; Univ. of Ga., B.S.F., 1949. A. E. Patterson, G. N. Bishop, D. J. Weddell.

Lightsey, W. F., Forester, Union Bag & Paper Corp., Savannah, Ga.; Univ. of Ga., B.S.F., 1947; Duke, M.F., 1948. A. E. Patterson, G. N. Bishop, D. J. Weddell.

Lunsford, H. C., Agric. Training Spec., Vet. Adm., Gainesville, Fla.; Univ. of Fla., B.S.F., 1938. Reinstatement.

Marron, J. J., 1960 Morningside St., Jacksonville, Fla.; Univ. of Fla., B.S.F., 1949. T. G. Herndon, C. G. Geltz, J. W. Miller.

Phillips, L. L., Rt. 1, Soperton, Ga.; Univ. of Ga., B.S.F., 1949. A. E. Patterson, G. N. Bishop, D. J. Weddell.

Rountree, C. C., Jr., Egypt, Ga.; Univ. of Ga., B.S.F., 1949. A. E. Patterson, G. N. Bishop, D. J. Weddell.

Scruggs, J. D., Madison, Fla.; Univ. of Fla., B.S.F., 1949. P. W. Frazier, J. W. Miller, E. A. Ziegler.

Simmons, H. W., Adel, Ga.; Univ. of Ga., B.S.F., 1949. A. E. Patterson, G. N. Bishop, D. J. Weddell.

Smith, L. F., Jr., Box 162, Starke, Fla.; Univ. of Fla., B.S.F., 1949. P. W. Frazer, C. G. Geltz, H. S. Newins.

Stamey, G. M., 326 Nelson Ferry Rd., Decatur, Ga.; Univ. of Ga., B.S.F., 1949. G. N. Bishop, D. J. Weddell, A. E. Patterson.

Wynens, J. C., Hillsboro, Ga.; Univ. of Ga., B.S.F., 1949. A. E. Patterson, G. N. Bishop, D. J. Weddell.

Member Grade

Martin, Ivan R., Ext. Forester, Alabama Ext. Service, Auburn, Ala.; La. State, B.S.F., 1939. Southeastern (Jr. member, 41R48).

Southern California

Junior Membership

Culley, T. S., Jr., 17804 Mission Blvd., Granada Hills, Calif.; Univ. of Calif., B.S.F., 1949. M. Krueger, F. S. Baker, R. A. Cockrell.

Upper Mississippi Valley

Junior Membership

Campbell, Duncan, Cons. Aid, S.C.S., Towner, N. Dak.; Univ. of Idaho, B.S.F., 1939. A. Ferber, E. L. Worthington, G. A. Turney.

Hasek, J. M., 2619 Hunt St., Ames, Iowa; Iowa State, B.S.F., 1949. A. L. McComb, R. E. Getty, C. B. Hartman.

Lovestead, H. S., Iowa State, Ames, Iowa; Iowa State, B.S.F., 1949. G. B. Hartman, L. F. Kellogg, G. W. Thomson.

Pietsch, W. W., 15 West State St., Mason City, Iowa; Iowa State, B.S.F., 1949. G. B. Hartman, D. W. Bensend, G. W. MacDonald.

Washington

Associate Membership

Kittredge, Frank A., Chief Engr., Natl. Park Service, Washington, D. C.; Univ. of Wash., B.S., (Engr.), 1912; C.E., 1915. Washington.

Member Grade

Wiggins, John E., Jr., Forester, U. S. Dept. of Interior, Washington, D. C.; N. C. State, B.S.F., 1941. Washington (Jr. member, 1945).

Wisconsin-Upper Michigan

Junior Membership

DeVriend, Adrain J., Dist. Forester, Wis, Cons. Dept., Campbellsport, Wis.; Mich. College of Mining & Tech., B.S.F., 1947. Wisconsin-Upper Michigan.

George, E. H., 2738 Winneguah Rd., Madison, Wisconsin; Univ. of Mich., B.S.F., 1949. S. W. Allen, L. J. Young, John Carow.

Marcouiller, J. J., Jr., Forester, Cons. Water Power & Paper Co., Rhinelander, Wisconsin; N. Y. State, B.S.F., 1949. J. S. Illick, H. L. Shirley, L. P. Plumley.

Mortier, R. L., Forester, Wis. Cons. Dept., Madison, Wis.; Univ. of Mich., B.S.F., 1947; M.S.F., 1948. R. W. Abbott, F. G. Wilson, F. B. Trenk.

Ott, C. A., 1107 Ferry St., LaCrosse, Wis.; Univ. of Mich., B.S.F., 1949. S. T. Dana, J. W. Brown, L. J. Young.

Schmidt, H. N., Forest Rgr., Brule Rgr. Sta., Brule, Wisconsin; Iowa State, B.S.F., 1949. G. B. Hartman, A. L. McComb, G. B. MacDonald.

The following have been Junior members for at least 6 years and are eligible for automatic advancement to Member grade. The Section has certified them as actively engaged in forestry work and competent to represent the profession honorably and capably in the performance of their duties.

Central States

Bird Ronald L, Forest Fire Exp. Sta., Roscommon, Mich. Central States (Jr. member, 1932).

Gaiser, R. N., Box 203, Athens, Ohio. Central States (Jr. member, 1940).

King, J. C., Jr., 454 3rd St., Manistee, Mich. Central States (Jr. member, 1939).

Lindl, Richard, Route 3, Bowling Green, Ohio. Central States (Jr. member, 1940).

Morgan, James T., 108 E. 11th Ave., Columbus, Ohio. Central States (Jr. member, 1942).

Schroeder, Paul, Allegan State Forest, Allegan, Mich. Central States (Jr. member, 1937).

Seward, James R., U.S.F.S., Athens, Ohio. Central States (Jr. member, 30R46).

Gulf States

Sealander, Irvin L., Range Cons., S.C.S., Childress, Texas. Gulf States (Jr. member, 1940).

Intermountain

McKee, Ernest E., U.S.F.S., Challis, Idaho. Intermountain (Jr. member, 1939).

New England

Breon, T. F., Conway, N. H. New England (Jr. member, 33R48).

Brown, K. B., Fredriction, N. B., Canada. New England Jr. member, 39R45).

Burns, K., Cumberland Mills, Me. New England (Jr. member, 1930).

Diehl, R. B., Suncook, N. H. New England (Jr. member, 1934).

Fenton, R. H., Storrs, Conn. New England (Jr. member, 39R43R46).

Fogh, I. F., Three Rivers, P. Q., Canada. New England (Jr. member, 1939).

King, C. K., Chisholm, Me. New England (Jr. member, 29R47).

Matthews, C. M., Durham, N. H.; New England (Jr. member, 38R47).

Phipps, R. H. K., Gorham, N. H. New England (Jr. member, 1943).

Plummer, H. A., Orono, Me. New England (Jr. member, 36R47).

Shaw, E. E., Quebec, Canada. New England (Jr. member, 1936).

Thompson, W. E., Boscawen, N. H. New England (Jr. member, 1933).

Wentworth, W. H., Waterville, Me. New England (Jr. member, 1934).

New York

Armstrong, M. M., P.O. Box 611, Keeseville, N. Y. New York (Jr. member, 1942).

Bonner, Edward, Spruce Falls Power & Paper Co., Ontario, Canada. New York (Jr. member, 1941).

Cram, W. D., Dept. of Lands and Forests, Ontario, Canada. New York (Jr. member, 1939).

Metcalf, W. S., R.F.D. #2, Albion, N. Y. New York (Jr. member, 1941).

McGraw, E. B., Ontario Paper Co., Ltd., Ontario, Canada. New York (Jr. member, 1929).

Mulvaney, F. E., 1 Oxford, New Hartford, N. Y. New York (Jr. member, 1938).

Parsons, George, R.F.D. #1, Herkimer, N. Y. New York (Jr. member, 35R48).

Ozark

Brown, Richard I., Soil Cons. Service, Evening Shade, Ark. Ozark (Jr. member, 1936).

Southeastern

Campbell, W. A., Int. Paper Co., Bronson, Fla. Southeastern (Jr. member, 1939).

Hinson, Ernest. Baldwin, Ga. Southeastern (Jr. member, 34R38R46).

Joy, Fred L., S. E. Forest Exp. Sta., Gainesville, Fla. Southeastern (Jr. member, 1935).

Knoch, H. G., U.S.F.S., Atlanta, Ga. Southeastern (Jr. member, 1935).

Kuzmitz, V. J., Box 41, Madison, Ga. Southeastern (Jr. member, 1941).

Lee, J. F., Fla. Forest Service, Lake City, Fla. Southeastern (Jr. member, 41R44).

Molpus, E. L., Fla. Forest Service, Ocala, Fla. Southeastern (Jr. member, 1941).

Moore, W. H., Southern Resin and Chemical Co., Glen St. Mary, Fla. Southeastern (Jr. member, 30R42).

Muller, Carl A., Ala. State Forest Nursery, Autaugaville, Ala. Southeastern (Jr. member, 1943).

Nease, Allen D., Robinson Improvement Co., St. Augustine, Fla. Southeastern (Jr. member, 1941).

Prince, W. J., Box 51, Tate, Ga. Southeastern (Jr. member, 1941).

Rowland, C. A., Jr., School of Forestry, Univ. of Ga., Athens, Ga. Southeastern (Jr. member, 1934).
Shirley, H. M., Hudson Pulp and Paper Co., Palatka, Fla. Southeastern (Jr. member, 36R47).
Swinford, K. R., Univ. of Fla., Gainesville, Fla. Southeastern (Jr. member, 39R47).
Wilkinson, W. H., Jr. Forester, Alger-Sullivan Lbr. Co., Century, Fla. Southeastern (Jr. member, 1943).

Southern California

Armstrong, G. W., 1532 Rock Glen Ave., Glendale, Calif. Southern California (Jr. member, 1939).
Bauer, D. R., U.S.F.S., Idyllwild, Calif. Southern California (Jr. member, 1942).
Gossard, S. F., Henniger Flats Nursery, Pine Crest, Altadena, Calif. Southern California (Jr. member, 1939).
Hobbs, Samuel M., 1862 N. Ave., Los Angeles, Calif. Southern California (Jr. member, 1940).
Horton, Jerome S., U.S.F.S., Glendora, Calif. Southern California (Jr. member, 1935).
Intorf, P. H., U.S.F.S., Isabella, Calif. Southern California (Jr. member, 1942).
Kern, Jack C., 75 Wisteria, Arcadia, Calif. Southern California (Jr. member, 1936).
Ludwig, Gordon W., 1301 Vileta Drive, Alhambra, Calif. Southern California (Jr. member, 1940).
Rickel, L. A., U.S.F.S., Santa Barbara, Calif. Southern California (Jr. member, 1936R46).
Wilson, Robert, 16505 Mission Blvd., San Fernando, Calif. Southern California (Jr. member, 1925).

Upper Mississippi Valley

Ferber, Arthur E., Nursery Mgr., U.S.D.A., Mandan, N. Dak. Upper Mississippi Valley (Jr. member, 1941).
Ogrinc, J. P., Supv., Farm Forestry, Iron Range Resources and Rehabilitation, Grand Rapids, Mich. Upper Mississippi Valley (Jr. member, 1942).

Washington

Spoden, F. G., Jr., 1631 Ripon Place, Alexandria, Va. Washington (Jr. member, 1934).

Wisconsin-Upper Michigan

Juntunen, Emil H., Forester, U.S.F.S., Milwaukee, Wisconsin. Wisconsin-Upper Michigan (Jr. member, 1935).

Elections to Membership

Affiliate

Cody, T. H., Ore.
Hickman, D. N., Ind.
Leland, J. M., S. C.

Associate

Crosby, W. E., Wash.

Junior

Baltus, J. R., Wis.
Bell, J. F., Ore.
Bennett, D. L., Calif.
Brunson, F. D., Ohio
Burkholder, R. C., Wyo.
Cannon, R. W., Ga.
Cleveland, G. E., Ore.
Coad, James, Jr., Ga.
Davenport, E. A., Jr., Ga.
Deardorff, G. W., Ill.
Dickinson, J. E., Fla.
Edmunds, W. S., N. C.
Feinberg, B., N. Y.
Fisher, G. W., Fla.
Gebhart, E. J., Ohio
Gorman, J. L., W. Va.
Hendry, L. E., S. Dak.
Hinkle, J. C., Jr., Va.
Hitchcock, W. J., Fla.
Hopkins, B. W., N. Y.
Horan, D. F., Fla.
Kidd, E. L., Jr., Ala.
Martinsson, P. E., Canada
Mathews, J. R., Jr., Fla.
Millwood, C. E., Ga.
Moses, P. J., Fla.
Nelson, K., Texas
Owen, I. H., Jr., Ga.
Pagter, L. B., Jr., Ore.
Pierce, M. A., Va.
Rapp, E., Costa Rica.
Reed, S. W., Ore.
Richter, W. J., Jr., Ga.
Lavinder, G. W., Ga.
Lundy, L. L., Ga.
MacIntosh, M. B., N. H.
Rodger, E. E., Va.
Seymour, J. L., Ga.
Smith, H. B., Ore.
Snowden, J. B., Fla.
Spilsbury, B. J., Texas
Sumner, E. A., Ga.
Tait, R. I., Wash.
Taylor, J., Ga.
Trenholm, R. L., Ore.
Wagoner, H. N., Iowa
Watson, J. S., Conn.
Webb, R. N., Minn.
Wilkinson, R. D., Ore.

Member

Anderson, H. O., Tenn.
Appel, A. J., N. J.
Beil, K. E., Wash.
Bittinger, C. A., Pa.
Blair, R. W., Mich.
Bliss, E. S., N. Mex.
Brainard, W. H., N. Mex.
Casanova, F. E., Ariz.
Cox, Guy, La.
Dill, H. C., Ore.
Eckhart, F. A., N. J.
Engelking, T. G., Texas
Farrand, E. P., Pa.
Fox, G. F., Miss.
Green, L. S., Tenn.
Gregory, G. R., Texas
Griswold, F. S., Ariz.
Hahn, V. W., Mich.
Hampf, F. E., W. Va.
Hardin, W. L., S. C.
Hartman, W. T., Texas
Heintzelman, J. G., Wash.
Hube, F. H., Miss.
Irwin, R. F., Texas
Jones, R. D., Pa.
King, P. E., La.
Krause, R. E., La.
Krauter, O. W., Wash.
Krissoff, A., Mich.
Maxwell, E. G., Neb.
Morgan, K. J., Texas
Morgan, R. B., La.
Mueller, E. R., Texas
Murphy, H. E., Tenn.
Nelson, M. M., Ore.
Nicholson, N. O., Ore.
Ogden, W. J., Tenn.
Olson, G. L., Ariz.
Owens, W. R., Jr., Texas
Paddock, W. R., Tenn.
Page, C. R., Tenn.
Ramke, T. F., Tenn.
Rindt, C. A., Ore.
Robinson, J. W., Tenn.
Schnell, R. L., Tenn.
Seale, R. H., Idaho
Smith, H. E., Miss.
Smith, V. D., Ariz.
Sprott, C. H., Texas
Thurner, J. T., Ky.
Timm, J. L., Idaho
VanNort, A. C., Pa.
Vincent, P. Y., Texas
Wall, L. A., N. Mex.
Walters, G., Ky.
Wenban, J. L., Wyo.
Whitman, J. A., N. C.
Wild, P. D., N. Mex.

Reinstated

Junior

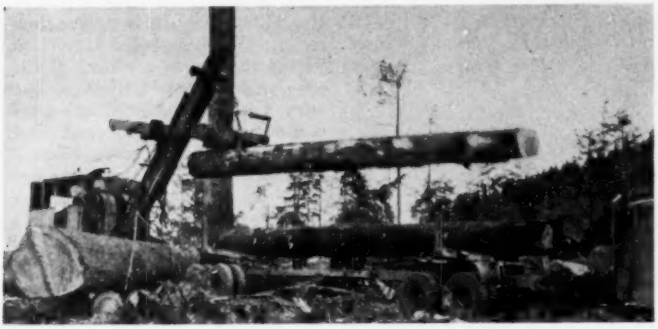
Anderson, E. A., Wis.
Ward, W. W., Pa.

Member

Guernsey, W. G., Mont.

Forestry News

Compiled by ROBERT D. HOSTETTER, *Assistant Executive Secretary*



Air Tongs Load Trucks in Four Minutes

Newly-developed Berger-Rees Air Tongs, shown above installed on a 1929 P & H 1¼-yard shovel, are capable of loading up to 8,000 feet of logs on a truck in approximately 4 to 5 minutes, according to the Berger Engineering Works, Inc. of Seattle, Wash.

Operated by compressed air, the tongs wrap around the logs, thus preventing slabbing. Boom extensions are usually added to extend the sticks from 4 to 6 feet. The tongs can be used on any size or model of shovel, although it is necessary to install a 30 cu. ft. per minute air compressor driven from the engine of the shovel.

Said to load logs faster than any other method, use of the air tongs eliminates the need for tong shakers and reduces the safety hazard.

Forestry Outlines Prepared For Extension Personnel

Outlines for both field and indoor demonstrations which are designed to aid county agents in conducting educational meetings have been developed by the North Carolina Extension Service's Division of Program Planning in cooperation with R. W. Graeber, extension forester.

Forest planting, thinning, stand improvement, pruning, scaling, and selective cutting as well as tree identification and planting demonstrations for 4-H groups are included in the outlines.

Phytotron Simulates Climates

The Earhart Plant Research Laboratory, dedicated on June 7 at the California Institute of Technology, Pasadena, is so designed that plants can be grown under practically every climatic condition under which plant growth is possible.

The phytotron, as the laboratory is called, allows independent control of light, temperature, humidity, gas content of air, wind, rain, and fog.

Deer Create Airport Hazard

It is necessary for a man on horseback to chase the deer off the Josephs, Ore., airport to make way for incoming planes. The deer, adjusted to the air age, dote on the tender shoots of newly planted grass.

Forest Named for Pinchot

On June 15 President Harry S. Truman signed a proclamation which changed the name of the Columbia National Forest in the State of Washington to the Gifford Pinchot National Forest in honor of the first Chief of the U. S. Forest Service who died October 4, 1946.

Pinchot helped establish the forest which now bears his name.

Formal dedication of the forest as a memorial will be held on October 15 immediately following the annual meeting of the Society of American Foresters at Seattle. The first general session of the meeting will be on Tuesday, October 11.

Association Executives Meet

Executives of State forestry associations from New Hampshire, Virginia, Connecticut, West Virginia, North Carolina, Ohio, Massachusetts, Georgia, and Louisiana met on June 27 and 28 at Wananish, N. C. to discuss problems of mutual interest including programs and activities, finances, membership, organization patterns, and the possibility of including state forestry association news in *American Forests.*

Harris A. Reynolds, secretary of the Massachusetts Forest and Park Association, was elected to serve as chairman for a meeting to be held next year.

National Forest Timber Sales Adjusted to Market Prices

To help maintain the stability of the industry using national forest timber and the communities and jobs depending on it, the Forest Service, U. S. Department of Agriculture, on July 5 put into effect in the 11 western states and South Dakota a plan whereby the cost of national forest timber may be adjusted quarterly in accordance with fluctuating market prices.

The immediate effect of the plan will be to protect purchasers of national forest timber from being squeezed between the cost of the timber fixed by bid contracts and falling lumber prices.

Many lumber manufacturers are said to have become reluctant to buy national forest timber at present rates because of the uncertainty of the lumber market. The effect of the new plan for adjusting prices to market fluctuations will be to divide the risk between the Government and the timber purchasers.

Up to now, national forest timber has been appraised and advertised at a minimum price for sale to bidders. The successful bidder cut and paid for the timber at the bid price, no bids under the advertised price being accepted.

While appraisal and advertising procedures will remain the same as before under the new plan, on sales which are offered or modified during the balance of the 1949 operating season the bid price may be adjusted quarterly to the average market price index of the Western Pine Association. The adjustment will be 40 percent of the decrease or increase in the price of lumber as shown by the index. The new system cannot be applied to existing short term sales which lack provisions for stumpage rate adjustments, but it may be made available in classes of sales where such an adjustment is not precluded by the terms of the contract.

In announcing the new policy, the Forest Service made clear that it was to be operative only in connection with sales, both short and long term, offered or modified during the balance of this year.

Oregon's Budworm Outbreaks Checked By Aerial Spraying

More than 260,000 acres—bearing timber valued at over $31,500,000—was sprayed early this summer to control the devastating spruce budworm in Oregon's forests in the Mt. Hood area.

The fifteen aircraft used, including three helicopters and a twin-engined B-18 capable of carrying a load of 1,000 gallons of insect spray and dispensing it at the rate of 95 gallons per minute, were supplied by the Ace Flying Service of Salem, Ore.

The Mt. Hood project was part of a general program, the second largest ever undertaken, instituted by the state of Oregon, private timber interests, and the federal government.

Under the direction of John B. Woods, Jr., assistant state forester, 162,000 acres of state and privately owned timber were sprayed in the vicinity of Eugene.

Specifications for an insecticide to check the budworm infestation were set up, and Pennsylvania Salt Manufacturing Company of Washington, chemical firm, with the only DDT-producing unit in the Northwest, located in Portland, was called in to develop a special formula. So successful were the research laboratories of Pennsalt that a product resulted costing less than two-thirds of the original government estimate.

The budworm was described by Robert L. Furniss, of the Forest Insect Laboratory, Portland, as a "front rank destroyer of fir and spruce forests in much of North America. It has caused widespread destruction of timber in the East with losses running into untold millions of dollars.

"If the outbreaks in Oregon were allowed to run unchecked, similar losses could occur here," he said.

Over-all project expenditure was $1.07 per acre.

Horse Races Finance Wildlife

Expenditures of $4,470,361 derived from the states' pari-mutuel horse racing receipts have been authorized for fish and game restoration projects by California's Wildlife Conservation Board.

Top priority has been given to waterfowl and trout programs in the allocation of these funds.

1949 Yearbook Features Trees

"Trees," the 1949 Yearbook of Agriculture, will be ready for distribution on August 18 by members of the U. S. Senate and House of Representatives. It is also for sale at $2.00 per copy by the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Divided into four main sections, "The Tree," "Trees and Homes," "Forests and Men," and "Lists and Other Aids," the book includes 128 articles by 161 contributors, a 16-page section of color photographs, and in its entirety has 960 pages weighing three pounds.

Articles on forest types, forest soils, forest renewal, breeding of pines and poplars, production of planting stock, farm forests, industrial forests, and many other subjects are included.

Italian Mills Modernized

Use of Marshall Plan funds to help pay for a project to modernize and integrate the Cartiere Burge paper mills at Verzuolo and Corsico, Italy, has been approved by the Economic Cooperation Administration.

ECA approved the use of $1,650,000 in recovery funds for the purchase of machinery and equipment in the United States. The Cartiere Burge company will furnish an additional one billion lire to meet other costs of the project.

The modernization program will permit an increase in the newsprint output of the two plants from about 210 metric tons per day to 295 metric tons per day.

Cartiere Burge is Italy's largest producer of paper, accounting for about one-third of the national production.

Scale Gives Slope on Photos

A new percent slope scale, which permits measurements on aerial photos without reference to the line of flight have recently been developed. In use, the difference in elevation between the upper and lower ends of the slope to be measured is first determined, after which, by properly placing the scale, the slope percent can be read direct.

Prints of the percent slope scale can be secured through the Engineering Office, U. S. Forest Service, Washington 25, D. C.

Schrader Named Director of Forest Products Institute

The Forest Products Commission of the State of Washington announced the appointment of Dr. O. Harry Schrader, Jr. as technical director, effective June 15th. Dr. Schrader, associate professor of forest products at the College of Forestry, University of Washington, will continue in that position part time. The Institute will maintain offices at Alfred H. Anderson Hall on the University of Washington campus.

The first project to be undertaken by the Institute is an inventory of the quantity, quality, and location of unutilized wood resulting from current logging and manufacturing industries.

Concurrently a study will be carried out on logging costs and equipment in connection with second-growth timber operations and salvage logging. The Institute also plans to issue publications describing operations that emphasize complete utilization of the timber resources of the state.

A staff of five technically trained foresters will carry out the Institute program with an additional part time staff employed during the summer months.

Bears Damage Young Trees

Mortality in 10-to-15-year-old stands of Douglas-fir on the St. Helens Tree Farm has been particularly high the past two springs with 80 percent of the damage attributed to bears, according to Edwin Heacox, managing forester for the Weyerhaeuser Timber Company.

John G. Miles, company forester who has been surveying the damage, reports that bears chew the bark off the most vigorous trees, generally girdling the tree in the process. "The bears seem to relish the cambium in the early spring when it is especially sweet and moist and apparently more effective as a tonic and laxative," he said.

Wood Technologist Appointed

Arne K. Kemp has been appointed to the faculty of the Division of Forestry of the University of Minnesota where he will specialize in wood technology, furniture, and lumber merchandising.

Forestry Legislation

Forest

S.979, a companion bill to H. R. 2001, became Public Law 128 on June 25. Authorized under the law is the appropriation of not to exceed $11,000,000 to complete the initial national survey of forest resources and additional annual appropriations of $1,500,000 to keep the survey current.

S.J. Res. 53, which provides for reforestation and revegetation of national forests, passed the Senate and on June 6 was reported favorably to the floor of the House.

Wildlife

S.1076, to increase the price of duck stamps from $1.00 to $2.00 passed the Senate on June 14 and on June 29 was reported to the House for action.

H. R. 1746, which would do for fish what Pittman-Robertson has done for game, was reported favorably to the House on June 29 by the Committee on Merchant Marine and Fisheries.

H. R. 4403, to facilitate the administration by the Secretary of the Interior, in cooperation with other federal, state, and local agencies, of the recreational uses of lands and waters within federal reservoir projects, was favorably reported by the Committee on Public Lands on June 27.

Soil and Water

Hearings commenced on June 20 on Columbia Valley Administration proposals. They will probably be continued in the Northwest after this session of Congress.

H. R. 3181, to provide for more effective conservation in the arid and semiarid areas of the U. S., became Public Law 99 on June 13.

Protection

S.1659, to grant the consent of Congress to an interstate forest fire protection compact in New England became Public Law 129 on June 25.

H. R. 2361, the Reorganization Act of 1949, became Public Law 109 on June 20 and seven proposals for reorganization have already been submitted by the President. S. 2055 and H. R. 5179 apply to the Department of Agriculture.

Pennsylvania Adds Forests

Recent addition of two tracts totalling 1,160 acres brings the state forest area in Pennsylvania to 1,727,220 acres.

Early summer droughts in the Northeast and Northwest created forest fire hazards that were considerably worse than usual.

Bernard Orell, above, newly appointed state forester in Washington, issued closure orders in several townships which curtailed logging operations. Humidities plunged below the 30 percent deadline at which point all logging operations must cease. Public forests were also closed to traffic.

In New York, Conservation Commissioner Perry B. Duryea credited full cooperation of the press, radio, and the public with preventing serious fires that might have occurred during the dry spell which equalled the drought of 1908.

Maine Revises Fire Laws

Effective August 6 forest fire control will be placed under the forestry department for the entire state of Maine. Previously the state has cooperated with the local town forest fire wardens but had no authority to direct activities.

Other forestry laws recently enacted in Maine provide that all primary wood-using portable sawmills must be licensed, that slash be properly disposed of, that town forest fire wardens will be appointed by the forest commissioner, and that persons requested to fight fires who fail to do so will pay a fine of $10.

Reynolds Summarizes Results

A folder describing the policies, practices, and results on the Crossett Farm Forestry Forties was issued in June by the U. S. Forest Service.

R. R. Reynolds, the author, emphasized that during the ten years that the best forty has been managed the average financial return has been $15 per acre per year. The remaining stand is equal in volume to that of 1937, but the timber is now of better quality. During the past ten years the tract produced 122 thousand board feet of sawlogs, 280 standard cords of pulpwood, 170 cords of firewood, and 300 fence posts.

Aberdeen Hearing Announced For Sustained Yield Unit

Regional Forester H. J. Andrews has announced that a hearing will be held at Aberdeen, Wash. on August 2 for the purpose of getting views of interested people concerning the establishment of a Grays Harbor federal sustained yield unit.

Andrews said that this unit involves only national forest timber tributary to the Grays Harbor communities. One of the principal objectives of the cutting program proposed for this unit is to insure that the timber from local national forest lands will be given primary manufacture in local plants. Full utilization and remanufacture within the Grays Harbor communities will be encouraged.

The forest service estimates that the sustained yield cut from this area will be 60 million board feet per year. Involved are 116,000 acres of national forest lands with an aggregate volume of almost 4½ billion board feet, most of which is virgin timber.

Arizona District Featured

Life magazine has selected Beaver Creek Ranger District of the Coconino National Forest in northern Arizona, for a photo essay on the Forest Ranger. Preparation of the article began in June.

Unprotected Forest Area Suffers 14 Percent Loss

During the 1948 calendar year 167,508 forest fires are reported to have burned on state and private lands, 64 percent of them occurring on unprotected lands. Eighty-eight percent of the over sixteen million acres burned was on unprotected lands. Burns covered .58 percent of the protected state and private forest lands while 14.35 percent of the unprotected area burned, according to cooperative fire reports compiled by the U. S. Forest Service.

Fires burned on .14 percent of the 218,728,000 acres of federal forest land.

The Pacific states have 100 percent forest fire protection on all forest lands. In other groups of states, the percent of the state and private forest area protected as compared with the area needing protection is as follows: Eastern—93, Southern—59, North Central—88, Rocky Mountain —72.

Business Executives Honored

Special awards for outstanding service in the public interest were made to some of the nation's top business executives on June 28 at a forest fire prevention rally in Washington, D. C.

Secretary of Agriculture Charles F. Brannan praised American business for throwing its advertising support into the nationwide fight against forest fires through a public service campaign sponsored by the Advertising Council. American industry has contributed more than $3,000,000 of advertising space and time to the cause over the past several years.

A special feature of the rally was a demonstration by four smokejumpers from the U. S. Forest Service base at Missoula, Mont., who parachuted to the Ellipse between the White House and the Washington monument.

Charles E. Wilson, president of General Electric Company and chairman of the industries advisory committee of the Advertising Council, acted as spokesman of the group of business executives present.

State Advises Timber Owners

During the 11 months from July 1, 1948 to May 31, 1949, over 21 million board feet of sawtimber and over 4,100 cords of pulpwood have been marked by foresters of the South Carolina State Commission of Forestry, according to Assistant State Forester E. B. Price.

Trees are marked and volume estimates computed for a charge of 35 cents per thousand board feet or 13 cents per standard cord.

Cutting was recommended on less than half the tracts for which farmers asked management assistance.

Leaves Set in Clear Plastic

"The use of thermosetting plastic for the preservation of leaves in natural colour" is the title of a pamphlet recently issued by the Dominion Entomologist, Dominion Department of Agriculture, Ottawa, Canada.

Techniques for permanently preserving leaves and other objects by completely embedding them in transparent plastic are described.

The resulting exhibits are practically unbreakable and preserve all details of the leaves, even the color.

Southern Pulpwood Association Completes Field Organization

Employment of a fourth area forester recently completed the field organization of the Southern Pulpwood Conservation Association. He is E. A. Freeman who will serve Texas, Arkansas, and most of Louisiana from headquarters at Ruston, La. S.P.C.A. engages in activities promoting the wise use of forest land in the South.

Other area foresters are: Dawson M. Jennings, Montgomery, Ala., who serves Alabama, Mississippi, and parts of Louisiana and Florida; Howard J. Doyle, Macon, Ga., who works in Florida, Georgia, and most of South Carolina; and Francis J. Cook, Albermarle, N. C., whose territory includes Virginia, North Carolina, and small parts of South Carolina, Georgia, and Tenessee.

These men serve as liaison contacts between the pulpwood industry and the timber grower, producers of pulpwood, public forestry agencies, and the general public. They engage in activities encouraging the use of the best forest practices benefiting both the timber grower and timber producer. In cooperation with public forestry agencies, demonstrations are arranged by these field men at which fire fighting equipment, tree planting equipment and technique, and proper cutting practices are emphasized.

Krueger Heads Texas Forests

Carl G. Krueger has been appointed to succeed Henry B. Bosworth as forest supervisor in charge of the Texas National Forests with headquarters at Lufkin, Tex.

Henry Bosworth has been appointed Director of Tropical Research at Rio Piedras, Puerto Rico.

Donald J. Morriss will succeed Krueger as forest supervisor in charge of the Pisgah-Croatan National Forests with headquarters at Asheville, N. C.

Iowa State Honors Allen

Professor Shirley W. Allen, president of the Society of American Foresters in 1946-47, was given an Alumni Merit Award by the Iowa State College Alumni Club of Chicago during Alumni Day ceremonies at Ames, Iowa on June 11.

Professor Allen graduated from Iowa State in 1909 and received his master's degree there in 1929.

Forest Plantations Insured

At least two U. S. insurance companies are now underwriting fire insurance on forest plantations according to *Random Forestry Notes,* issued by the U. S. Extension and Forest Services. They are the New Hampshire Fire Insurance Company of Manchester, N. H. and The Home Insurance Company of New York, N. Y. Both are somewhat reluctant, however. The former decrees that "the amount of insurance per acre on a timber plantation must not exceed the actual outlay for trees and labor, plus compound interest at a rate of not exceeding 5 percent per annum from the date of planting. Maximum amounts which can be insured are also fixed. The other company writes policies for standing timber only for some clients for whom they write a substantial amount of insurance.

Expands Conservation Programs

To take care of its expanded forestry and wildlife programs, which became effective July 1, the West Virginia conservation commission recently employed 17 men. Nine will serve as farm foresters, seven were added to the game management division's staff and one was placed in the engineering division.

The additional farm foresters, said Conservation Director C. F. McClintic, will give every county in the state except three—Kanawha, McDowell and Wyoming—the services of a farm forester. Those counties will be served by a district forester.

Rainbows Camouflage Leaders

Camouflaged nylon monofilament leaders, tippits, coils, and spinning lines are now available. They are dyed the colors of the rainbow by a special process. The colors are in the order in which they appear in the spectrum, and this feature, according to the manufacturers, aids in making them virtually invisible.

Outdoor Recreation Cited

Over half of the 64-page June issue of *Ford Times* was devoted to a survey of the public recreation facilities in the United States, stressing the varied opportunities that vacationists have for forest recreation.

An added feature was a Paul Bunyan story.

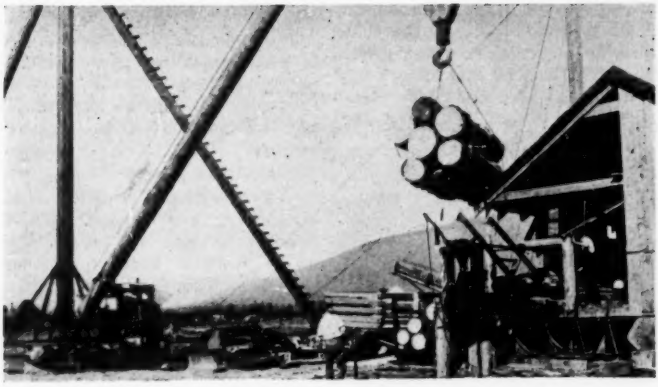


Photo by Ken Schell, Skagit Iron & Steel Works

Cradling Small Logs Proves Economical

The Soundview Pulp Company of Everett, Wash., has devised an economical method, illustrated above, for handling small western hemlock in salvage operations.

Tree lengths are yarded to a landing where they are bucked to about eight-foot lengths with a circular cutoff saw. Two cradles alternately receive the short lengths. As soon as one is filled, the logs are strapped with wire cable and swung as a unit by a boom to gondola or wood cars. In the photo, one bundle is being hoisted from its cradle as the other cradle is being filled.

This labor-saving method of log handling reduces costs of salvage and thus makes closer utilization possible.

Reforestation Expert Retires

George A. Duthie, veteran forester and president of Washington, D. C. Local No. 2 of the National Federation of Federal Employees, retired on June 30, after 40 years in the Forest Service.

For the past seven years Mr. Duthie has headed Federal Forest Service programs dealing with community forests and with Federal-State cooperative distribution of nursery stock.

He is credited with having contributed greatly to the establishment of state and local governments and by private organizations of an increasing number of community and school forests, the number of which has now reached the record total of 3,113.

He served in Region Two until 1930 when he was transferred to Washington as head of the Education Section of the Information Division of the Forest Service, a position which he held until 1942.

K. P. Davis Goes to Michigan

Dr. Kenneth P. Davis, head of the School of Forestry at Montana State University, will resign from that position to accept a position at the University of Michigan as professor of forest management this fall.

New Fiber Dissolves in Soap

A new synthetic fiber made from chemically modified cellulose, has been produced experimentally by the Bureau of Agricultural and Industrial Chemistry's Southern Regional Research Laboratory in New Orleans.

The fiber is spun from sodium carboxymethyl celloulose (a soluble compound made from wood or cotton cellulose) and the salts of certain metals, including lead, copper, and aluminum. It is colorless or lightly tinted, depending on the metal used. This unusual fiber will dissolve in soapy water or other weak alkali solutions. Because of this property it is useful as a "scaffolding" fiber in the weaving of novel fabrics from various textiles. Its dry strength—about equal to that of wool and slightly less than half that of cotton—is adequate for this purpose.

Distillation Stove Developed

A new woodburner designed for use as a space heater, a one-pipe furnace, or to connect with warm-air flues has been placed on the market by the Pantex Manufacturing Corporation, Pawtucket, R. I.

Called the Woodomat, the stove utilizes the wood distillation principle. Sticks two feet long and eight inches in diameter or of any smaller dimension can be used. Refueling is required but once a day.

California Tables Revised

New volume tables fitting three California species have been announced by Stephen N. Wyckoff, Director of the California Forest and Range Experiment Station, U. S. Forest Service. They are given in Research Note No. 60: "Form-Class Volume Tables for Ponderosa Pine, Douglas-fir and White Fir in California," by V. A. Clements, C. W. Stevens, and D. E. Roy.

The tables are based on the widely used Girard form class. They give the volume in board feet (Scribner rule) for individual 16 foot logs, and total tree volume between a 1.5 foot stump and a top diameter of 10 inches inside bark. They also show the volume and number of logs to an average utilized top. The utilized top is based on utilization practices existing on Forest Service timber sales in California during 1945. Tables for form classes 65 through 90 are provided.

Director Wyckoff said the new tables have three advantages over existing tables: (1) introducing special taper curves derived for the tables and form class provides the basis for more accurate esitmates of the volume of individual trees, (2) showing volumes of individual logs to a fixed top diameter enables the user to modify the tables to suit his own utilization practices, and (3) using a height classification based on a fixed top diameter simplifies application of the tables.

Practicing foresters can obtain copies by writing to the Experiment Station at P. O. Box 245, Berkeley 1, California.

Geese Trapped With Net

Herb Dill, superintendent of the Swan Lake Refuge near Sumner, Mo., has devised a new method for trapping wild geese and ducks to be banded.

The wily birds are lured with bait near the trap which consists of a large-mesh seine measuring 25 by 80 feet. When within range a switch is thrown firing three home-made cannons which fire projectiles attached to the leading edge of the carefully folded net carrying it over the birds.

Over 800 geese and ducks were trapped, banded, and released in one season. The record single catch was of over 80 blue and snow geese.

Ponderosa Doors Standardized

According to an announcement by the Commodity Standards Division of the National Bureau of Standards, printed copies of Commercial Standard CS120-48 covering Standard Stock Ponderosa Pine Doors, are now available.

This standard covers five grades and includes layouts for house, garage, cupboard, combination, French, summer, storm, and toilet doors and sidelights made from ponderosa pine that has been properly kiln-dried. It includes illustrations for 103 different stock designs from which selections can be made that will harmonize with various architectural styles. By referring to this standard and specifying the design number, the architect or purchaser can obtain doors that meet his need, with ample competition, and at a considerable saving in cost as compared with custom-made doors of like quality and construction.

Copies of the pamphlet may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., for 15 cents per copy.

Treating Posts Halves Cost

The ever-increasing scarcity of long-lasting woods for fence posts introduces a business opportunity for using preservatively treated forest thinnings, weed trees, fire- and ice-damaged trees, and little-used species to supply the 9 million posts needed annually in Virginia, according to R. A. Hertzler and W. R. Smith, authors of a new Forest Service publication, "The Preservative Treatment of Virginia's Fence Posts."

Many of the untreated fence posts being used in Virginia cost about 18 cents each and will rot in 4 years or less; thus, the annual cost is more than 4 cents. Fence posts properly treated with creosote or pentachlorophenol sell for about 55 cents (October 1948) and will last around 25 years at an annual cost of about 2 cents. Not only do the untreated posts cost more per year, but they will have to be replaced five times while the treated posts still stand firm.

Plants equipped to produce 160 to 640 treated posts per day employ two or four men full time and can be built for from $1,000 to $3,000.

The establishment of a number of fence post treating plants in Virginia would increase the utilization and value of the forests of the State, provide opportunities for small rural industries, and be of real service to Virginia farmers, say the authors.

Land Offices Consolidated

Consolidation of United States District Land Offices at Las Cruces and Santa Fe, New Mex., into a single Bureau of Land Management office at Santa Fe was made on July 1. The merger to provide better service to the public land users in the State is part of the general program of the Department of the Interior to decentralize administration of the public lands from Washington to the States in which the lands are located.

Authority to take final action on many types of land cases which heretofore have been handled in Washington also is included in the program for establishment of the New Mexico land office at Santa Fe. As a result, the public will find all the Federal land records for New Mexico in a single office; all types of applications can be filed there, and final action on most of them will be taken there.

Colorado land offices were also consolidated with all applications for use of public land anywhere in the state now being received in the Denver headquarters.

Daw Receives Promotion

T. E. Daw has been advanced to the position of assistant chief of the Michigan state forestry division, replacing G. S. McIntire who was made division chief recently.

Daw will assist in the administration of Michigan's 22 state forests and in the cooperative program with commercial timberland and farm woodlot owners.

Skunk Hollow Doesn't Rate

One of the more euphoniously-named tree farms occupies 20 of the 44 acres farmed by Hanley Morse of Coeur d' Alene, Ida. Its registration is "The Lone Pine Cherry Berry Dairy Duck Truck and Tree Farm."

It displaced the Skunk Hollow Tree Farm as having the most distinctive name.

Lumber Production Decreases

Sawmills of the Douglas-fir region produced 430 million feet of lumber less during the first five months of 1949 than in the same period last year.

Gee Named Wildlife Assistant

The appointment of Merle A. Gee of Albuquerque, New Mexico, as Assistant to Lloyd W. Swift, Chief of the Division of Wildlife Management in the Forest Service, has been announced.

Before coming to Washington, Gee served the Forest Service in various capacities in the Southwest. His most recent assignment was on the staff of the Regional Forester at Albuquerque as Wildlife Technician. Prior to that he spent a number of years as Forest Ranger on the Big Springs District, which also includes the Grand Canyon National Game Preserve and the range of the well-known Kaibab mule deer herd. In addition to his regular duties of National Forest administration, he was responsible for the important deer-livestock relationship studies which are being carried out cooperatively by the State of Arizona and the Forest Service.

Cope Works for World Peace

Joshua Cope, professor of forestry at Cornell University for the past 24 years, sailed June 30 for Finland where he will work for the Quaker International Voluntary Service of the American Friends Service Committee.

Before taking up his Service Committee assignment, Mr. Cope attended the World Forestry Congress at Helsinki from July 10 to July 20.

As an American Friends Service Committee representative, Mr. Cope will visit four work camps in Finland under the direction of the Finnish International Work Camp.

The purpose of the work camps is to build peace through small international groups of volunteers working, living, and learning together.

At the conclusion of the work camp program Mr. Cope will return to Helsinki where he will be associated with the Forestry Division of the University of Helsinki. He will return to the United States the beginning of next year.

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Europe Rates Ag and Industry Recovery above Housing Need

Targets for lumber and lumber products consumption, production, and imports in Marshall Plan countries for 1949-50 through 1952-53 depend upon the importance the countries place on housing and other construction in relation to the over-all recovery program, the Economic Cooperation Administration reported recently.

An ECA study on lumber and lumber products indicates that participating countries generally are saving recovery dollars that otherwise would be spent for lumber by controlling consumption, revising construction standards, and using substitute building materials, but mostly by placing housing needs in a category of low priority.

A fundamental recovery problem —whether the saving of dollars is more important in one direction than another—is illustrated by Western Europe's decisions to defer housing construction in favor of industrial and agricultural recovery programs, ECA's Lumber Branch pointed out in the study.

The problem is complicated, the study said, by the necessity for determining to what extent inadequate housing deters recovery generally.

Marshall Plan countries, through the Organization for European Economic Cooperation, have been asked to review their housing requirements in relation to other programs to establish: (a) whether lack of housing contributes to labor shortages in areas where increased labor supply would substantially increase production; (b) whether inadequate housing causes low morale and levelling off of worker productivity; (c) whether in areas with poor housing facilities, but possessing unemployed labor and other local resources, such resources should be used in a large-scale housing program.

Only 158 million feet were exported to participating countries in 1948 as compared with 560 million feet in 1947. A scarcity of dollars in Europe during the first half of 1948 was alleviated during the second half by ECA grants, but shipment of lumber from North America to Europe continued to decline.

Demand-supply trends indicate that two billion feet could be exported from the U. S. to the rest of the world in 1949-50.

Wood Technologist Retires

One of the country's first wood technologists, Dr. Carl C. Forsaith retired June 30 after 32 years on the faculty of the New York State College of Forestry, Syracuse.

CARL C. FORSAITH

He is an exponent of the view that foresters should serve wherever wood serves. Author of many technical scientific articles and publications from 1915 on, he is most recently co-author with A. J. Panshin and Dr. Harry P. Brown of "Textbook of Wood Technology," definitive work published in January of this year. He is assisting in preparation of a companion volume to be published in 1950. His specialty within wood technology is timber mechanics.

Ducklegger Fined $2,500

Judge Dal M. Lemmon of the Sacramento, Calif. Federal Court meted out the heaviest punishment on record for a violation of the Migratory Bird Treaty Act when he sentenced Donald E. Smith of Del Paso Heights, California, to 2½ years in prison and fined him $2,500. Smith had made the serious mistake of trying to sell 829 wild ducks to U. S. game management agents posing as wholesale buyers.

John C. Gifford (1870-1949)

John C. Gifford, a Society of American Foresters member since 1902, honored by election as a Fellow in 1945, died at the age of 79 on June 25 in Miami, Fla.

He received his B. S. degree at Swarthmore College in 1890 and the degree of Doctor of Economics in forestry at the University of Bavaria in 1899.

Georgia Increases Faculty

Two additions have recently been made to the faculty of the University of Georgia School of Forestry.

Robert D. Dixon has been named associate forester, and will spend his entire time on research. Mr. Dixon, a native of West Virginia, received his B.S.F. degree from the School of Forestry, University of Georgia in 1946, and his M.S.F. degree there in 1948.

While there he was employed on a joint research project sponsored by the School of Forestry, the Department of Agricultural Engineering, and the Phoenix Oil Company which led to the discovery of a simplified and safe method of high penetration of preservatives without the use of exhaust cylinder. He is now in charge of a 30,000 acre tract of timberland owned by the Georgia Experiment Station.

Leon A. Hargreaves, Jr. has been named instructor in forestry. Mr. Hargreaves, a native of Georgia, completed his work for the B.S.F. degree at the School of Forestry, University of Georgia in 1946. He received his M.S.F., with a major in silviculture, from the University of Georgia in 1947. Previous to his graduation, he was employed in the sawmill industry, and since graduation has been assistant extension forester, Georgia Agricultural Extension Service.

Virginia JC's Award Plaque

The Virginia layman with the most outstanding record for the promotion of forestry will be awarded a recognition plaque by the Virginia Junior Chamber of Commerce in 1950, according to Robert N. Hoskins, chairman of the forstry committees in both the Norfolk and State Chambers.

Known as the Norfolk plan, the program will honor outstanding individuals who have contributed to a more general acceptance and practice of good forestry.

Professional foresters are excluded from competition.

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Lumber Industry Supplies Books to Schools

Lumbermen throughout the country are watching with interest a program developed by members of the West Coast Lumbermen's Association for placing accurate and factual information on the forest products industry in the hands of high school and college students in Oregon, Washington and California.

A 12-volume Lumber Book Shelf, containing some of the finest available books on lumber, logging, forestry, and natural history, has already been presented to more than 130 high schools and colleges in the three states by members of the West Coast Lumbermen's Association.

The Book Shelf, illustrated above, is purchased by the individual mill, or a group of mills in a single community, and presented by mill officials to each school at a regular assembly.

Industry Replants 12,000 Acres

More than 12,000 acres of non-stocked private forest lands of western Washington and Oregon were planted with nursery-grown seedlings from November through mid-May in the largest reforestation project in the region's history, according to N. E. Bjorklund, forester in charge of the Forest Industries Tree Nursery at Nisqually.

Colorado Trees Illustrated

A revised edition of "Colorado Evergreens" by Robert E. More has just been issued by the Denver Museum of Natural History.

Native species are profusely illustrated, and a chapter on horticultural uses of native evergreens as well as one devoted to pictures of timberline trees are included.

Forest Activities Described

A new bulletin titled "Know your National Forests in California," prepared by Charles E. Fox, educational adviser, has been issued by the California Region of the U. S. Forest Service. It is written in non-technical language with subjects grouped for convenient use in classrooms.

Michigan Honors Tree Farmers

Governor G. Mennen Williams of Michigan presented tree farm certificates to 18 Upper Michigan forest owners on June 10 at the inauguration of the tree farm movement in that state, the twenty-fourth to adopt the program sponsored by American Forest Products Industries, Inc.

Other speakers included: Sydney Ferguson, A.F.P.I. head; Bruce Buell, forester for Northern Paper Mills, Green Bay, Wis.; Jay Price, regional forester from the Milwaukee office, U. S. Forest Service; L. J. Heinske, secretary-manager, Timber Producers Association, Ironwood; Charles Sage, vice president of Kimberly-Clark Corporation, Neenah, Wis.; P. J. Hoffmaster, director of the Michigan Conservation Department; A. J. Erickson, manager of the land and lumber department, Cleveland-Cliffs Iron Company; Francis Kiefer, president of the Port Huron Sulphite and Paper Company and chairman, executive committee, Michigan Forest Industries; and G. S. McIntire, Michigan state forester.

Addition of 619,956 acres of Michigan tree farms brought the nation's total to 18,271,748 acres.

Southern Pulpwood Industry Doubles 1948 Reforestation

The pulpwood industry in the South expanded its tree planting program by more than one hundred percent over last year's activity, as reported by H. J. Malsberger, General Manager of the Southern Pulpwood Conservation Association. All pulp, paper, and board mills in the territory supplied the information for the survey.

The pulpwood industry was responsible for having planted 56 million pine trees, of which 11½ million were contributed to small landowners. The remaining 44½ million trees were planted on lands owned by the industry. This action by the pulpmills resulted in placing about 60,000 additional acres of non-productive land well on the way toward producing a money crop of trees within 15 to 20 years. The industry purchased 42½ million trees from State forest nurseries and grew the remainder in their own nurseries.

Chas. M. Genaux Advanced

Chas. M. Genaux, of the Washington office of the Bureau of Land Management's Division of Forestry was advanced to assistant chief of the Division on June 20.

He received his master's degree from the University of Idaho in 1929 and had teaching experience at Utah State Agricultural College and University of Idaho, Southern Branch, shortly thereafter.

New Georgia Director Named

H. Guyton DeLoach has been named director of the Georgia Forestry Commission to succeed A. Ray Shirley who recently resigned to enter private industry.

DeLoach is a 1939 graduate of the University of Georgia and has risen from ranger to assistant district forester, district forester, assistant state forester, and now to state forester.

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WOOD TECHNOLOGY

Vol. I—Structure, Identification, Defects, and Uses of the Commercial Woods of the United States

By H. P. Brown, The New York State College of Forestry, Syracuse University; A. J. Panshin, Department of Forestry, Michigan State College, and C. C. Forsaith, The New York State College of Forestry, Syracuse University. *American Forestry Series.* 634 pages, $6.00

This book is a complete rewriting and revision of Brown and Panshin's well known *Identification of the Commercial Timbers of the United States.* It will be followed by a second volume dealing with the physical, mechanical, and chemical properties of wood. Together the volumes will constitute a complete treatment of the subject matter of wood technology. Vol. I covers factual information on the structure, identification, general properties, uses, and major defects of commercial wood in the United States. All material has been brought up to date, clarified, and presented in more logical sequence.

FOREST PATHOLOGY—New Second Edition

By John S. Boyce, Department of Forestry, Yale University. *American Forestry Series.* 526 pages, $6.00

This successful book has been thoroughly revised. Much of it has been entirely rewritten to include a wealth of information on such topics as salt spray injury, Phymatotrichum root rot, phloem necrosis of elm, Adelopus needle cast of Douglas fir, septoria canker of polpars, canker stain of plane tree, oak wilt, mimosa wilt, parsimmon wilt, and several other rots. New material has been included on the prevention and control of the deterioration of wood in service.

FIELDBOOK OF NATURAL HISTORY

By E. Laurence Palmer, Cornell University. 662 pages, textbook edition $5.00

Here, in one convenient volume, is an extraordinarily comprehensive guide to natural history. This fieldbook embraces birds, fish, plants, rocks and minerals, the stars, mollusks, reptiles, and mammals—more than 2,000 items and hundreds of pictures arranged and tabulated for easy reference. Each item has its descriptive identification, followed by data on range and location, life history, ecology, and economic importance. Common names, illustrations, and technical classifications are given for each item in this book.

HARVESTING TIMBER CROPS

By A. E. Wackerman, Duke University. *American Forestry Series.* 437 pages, $5.00

A text covering all phases of harvesting, from preliminary considerations, involved in planning and preparing for the actual harvesting steps, to cost controls and records. The final chapter, devoted to regional harvesting practices, was prepared by seven contributors, each an expert in his region. The subject of timber harvesting is treated as an integral part of forestry, rather than as an independent procedure. The author covers the harvesting of all important forest products such as saw logs, pulpwood, poles, ties, and veneer blocks. Throughout, the treatment is more analytical than descriptive. The illustrations are outstanding.

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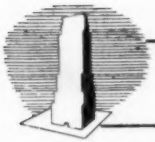

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